INDEFINITE QUANTITY/INDEFINITE DELIVERY CONTRACT FOR VARIOUS REPAIR, RENOVATION, AND ALTERATION SERVICES FOR THE ARCHITECT OF THE CAPITOL

August 3, 2006

Architect of the Capitol
United States Capitol
Washington, D.C. - 20515

PROJECT MANUAL
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RFP No. 060094

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VOLUME I

BUSINESS

SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)* January 2004	1. SOLICITATION NO. RFP NO. 060094	2. TYPE OF SOLICITATION _____ SEALED BID (*IFB*) XX NEGOTIATED (*RFP*)	3. DATE ISSUED 3 AUG 06	PAGE OF PAGES 1	2

IMPORTANT - The "offer" section on page 2 of 2 must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION NO.	6. PROJECT NO.

7. ISSUED BY CODE_____	8. ADDRESS OFFER TO (**NOTE - All handcarried bids will be rejected**)
ARCHITECT OF THE CAPITOL United States Capitol Washington, D.C. 20515	Architect of the Capitol Procurement Division Ford House Office Building Attn: John Friedhoff Room H2-263 Bid Room Second and "D" Streets, S.W. Washington, DC 20515

9. FOR INFORMATION CALL:	A. NAME	B. TELEPHONE NO. (*Include area code) (NO COLLECT CALLS*)
	John Friedhoff	(202) 226-4525

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

SUBJECT: **Job Order Contract for Architect of the Capitol.**

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (*Title, identifying no., date):*

11. The CONTRACTOR shall complete performance within **SEE CLAUSE AOC 52.211-5, SUPPLEMENTARY CONDITIONS** after Notice of Award.

12.The CONTRACTOR must furnish any required performance, payment bonds and insurance: XX YES __NO. If YES, within 15 calendar days after award.

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and 4 copies to perform the work required are due at the place specified in Item 8 by **2:00 p.m** local time **Sept. 14, 2006**. If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee **XX** is, ___ is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 90 Calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

OFFER *(Must be fully completed by offeror)*

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)* **DUNS NO.** _____ **TIN** _____	15. TELEPHONE & FACSIMILE NOS. *(Include area codes)* 16. REMITTANCE ADDRESS *(Include only if different than Item 14)*

17. The offeror agrees to perform the work required at the prices specified in the Schedule in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within 60 calendar days after the date offers are due.

18. The Offeror agrees to furnish any required performance, payment bonds and insurance.

19. ACKNOWLEDGMENT OF AMENDMENTS

(The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*	20B. SIGNATURE	20C. OFFER DATE

AWARD (*To be completed by Government)*

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION

24. SUBMIT INVOICES TO ADDRESS SHOWN IN ITEM 27 *(In Triplicate)*	25. AUTHORITY FOR NEGOTIATION, IF APPLICABLE

26. ADMINISTERED BY: CODE _____ See Block 8	27. PAYMENT WILL BE MADE BY: ARCHITECT OF THE CAPITOL Ford House Office Building Accounting Office, Room H2-205 Washington, D.C. 20024

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

____ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return _____ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in the contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, requirements, certifications, and specifications or incorporated by reference in or attached to this contract.	_____ 29. AWARD *(Contractor is not required to sign this document.)* Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*		31A. NAME OF CONTRACTING OFFICER *(Type or print)*	
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY:	31C. AWARD DATE

THE SCHEDULE

SUPPLIES OR SERVICES AND PRICES/COSTS FOR CONSTRUCTION

The Contractor shall furnish all supplies, equipment, personnel and services necessary to perform the repair, renovation, alteration to facilities required in either DC, MD, and VA. THE SPECIFICATIONS AND THE CONTRACT DRAWINGS will be provided as required by the Architect of the Capitol.

CONTRACT TYPE AND TERM: Under the Job Order Contract (JOC), services will be ordered on a fixed price, indefinite quantity basis by the award of Task Orders (TO). The services shall be order on a 12 month base period. This contract also provides for additional four option periods up to a maximum total term of 60 months as specified in the General Conditions clause Option to Extend the Term of the Contract.

1. SCHEDULE OF ITEMS (All Prices shall be awarded on task orders as Firm Fixed Price orders.)

ITEM NO.	DESCRIPTION	COEFFICIENT RATE	X	EST. AMOUNT	=	PRICE
001	Base contract period (Washington DC) Regular Work Hours (RWH) Pre-priced COEFFICIENT for RWH = _____	RATE	X	$20,000,000	=	_____
	Rate shall include Corporate G&A and Profit					
002	Base contract period (Washington DC) Other than regular Work Hours (ORWH) RATE Pre-priced COEFFICIENT for ORWH = _____	RATE	X	$3,750,000	=	_____
	Rate shall include Corporate G&A and Profit and overtime					
003	Base contract period (Anne Arundel, Maryland) Regular Work Hours (RWH) Pre-priced COEFFICIENT for RWH = _____	RATE	X	$1,000,000	=	_____
	Rate shall include Corporate G&A and Profit					
004	Base contract period (Culpeper, VA) Regular Work Hours (RWH) Pre-priced COEFFICIENT for RWH = _____	RATE	X	$250,000	=	_____

(Note: The following total is for Evaluation Purposes)

TOTAL FOR ENTIRE CONTRACT PERIOD $ _____

INSTRUCTIONS FOR COMPLETING THE PRICE SCHEDULE

The price schedule items (001 through 004) requires submission of your companies load rate in the column labeled (Coefficient Rate) attributable to the performance of this contract for the base period. These coefficient rates will be applied to the estimated $25 million of work for the entire contract period of 5 years for evaluation purposes only. The estimated dollar amount is a means of providing consistency to the evaluation. These amounts are not guaranteed. See Supplementary Conditions, paragraph 5.6 Adjustments to coefficients for option years.

MINIMUM AND MAXIMUM QUANTITIES: The guaranteed minimum quantity of work to be order is $50,000.00 including the option years. The maximum quantity of work to be ordered, including all option years, shall not exceed $25,000,000.00. The minimum task order amount is $2,500.00. The task order maximum amount is $2,000,000.00.

PRICING AND ORDERING OF REQUIRED SERVICES: The Contracting Officer (CO) will order Services by the issuance of fixed price Contract Task Orders (CTO) as specified in Paragraph 4 - Ordering of Work, Supplementary Conditions.

COMPETITION IN SUBCONTRACTING: The contractor shall comply with the requirements of FAR 52.244-5 Competition in Subcontracting. The JOC Contractor shall select subcontractors on a competitive basis to the maximum practical extent, to render compliance with Government subcontracting policies affecting this contract.

PROPOSAL REQUESTS: When requirements are identified for potential placement on this contract the CO will provide the JOC Contractor with a Statement of Work (SOW) and request a proposal to perform the work. The JOC Contractor will develop a subcontract solicitation document in sufficient detail to establish mutual understanding of the scope among the competing subcontractors and identify potential subcontractors for performance of the requirement. Typically, the JOC Contractor shall solicit a minimum of at least 3 independent, qualified and complete bids (including line item breakouts) from potential subcontractors. Simultaneously, the JOC Contractor shall provide a copy of the subcontract solicitation document and the list of the potential subcontractors to the A.O.C. Except as restricted by law and or Government regulation or in accordance with the restrictions provided in this solicitation, the determination of qualified subcontractors shall rest solely with the JOC Contractor.

END OF THE SCHEDULE

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GENERAL CONDITIONS

AOC52.202-2 DEFINITIONS - CONSTRUCTION (JUN 2004)

(a) The term "Government" means the United States of America, represented by the Architect of the Capitol, who is the Contracting Officer.

(b) The term "head of the agency" means the Committee, Commission, or other authority of the Legislative Branch of the Government having final jurisdiction or supervision over the work involved. The "other authority" as used in this paragraph includes the Architect of the Capitol in cases in which he has final jurisdiction or supervision over the work involved.

(c) The term "Architect" as used in the contract documents shall mean the Architect of the Capitol.

(d) The term "Contracting Officer" as used in the contract documents means the Architect of the Capitol or his duly authorized representative.

(e) The term "his duly authorized representative" means any person or persons or board authorized to act for the head of the agency within the scope of their authority.

(f) The term "Contractor" means the individual, partnership or corporation entering into a contract with the Government to perform the work specified.

(g) The term "Subcontractor", as used in this part, means any supplier, distributor, vendor, or firm that furnishes supplies or services to or for a prime contractor or other subcontractor. There is no privity of contract between the Government and the Subcontractors.

(h) The term "Project Director" means the individual designated by the Architect to monitor the progress of work from a technical standpoint. The duties and responsibilities of the Project Director shall include supervision of scheduling, receipt and verification of Contractor's payrolls in accordance with the Davis Bacon Act, coordination between Divisions, concerning resolution and/or avoidance of potential problems and, to the extent authorized by the Delegation of Authority, if any, issuance of clarifications, supplemental agreements and change orders to the Contractor.

(i) The term "contract documents" includes, collectively, the Project Manual, the contract drawings and the addenda and modifications thereto, if any.

(j) The term "work" includes, but is not limited to, materials, labor, and manufacture and fabrication of components.

(k) The term "specifications" means the portion of the Contract Documents that consist of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

(l) The term “drawings” means the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, that show the design, location and dimensions of the Work, and generally includes plans, elevations, sections, details, schedules and diagrams.

(m) Wherever in the specifications or upon the drawings the word “directed,” “required,” “ordered,” “designated,” “prescribed,” or words of like import are used, it shall be understood that the “direction,” “requirement,” “order,” “designation,” or “prescription,” of the Contracting Officer is intended and similarly the words “approved,” “acceptable,” “satisfactory,” or words of like import shall mean “approved by” or “acceptable to,” or “satisfactory to” the Contracting Officer, unless otherwise expressly stated.

(n) Where “as shown,” “as indicated,” “as detailed,” or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word “provided” as used herein shall be understood to mean “provide complete in place,” that is “furnished and installed.”

(End of clause)

AOC52.203-1 ADVERTISING/PROMOTIONAL MATERIALS (DEC 2005)

(a) It is the policy of the Congress to discourage contractors providing services and supplies to the Legislative Branch entities, including the Architect of the Capitol, from advertising practices that feature the Capitol and Capitol Complex in a manner in which conveys, or is reasonably calculated to convey, a false impression of sponsorship, approval or endorsement of any product or service by the Congress, the Government of the United States, or any Department, Agency or instrumentality thereof.

(b) Contractors performing construction services for Legislative Branch entities, including the Architect of the Capitol, are discouraged from capitalizing on their contractual relationships with such entities and shall not engage in advertising practices which convey, or are reasonably calculated to convey, a false impression of sponsorship, approval or endorsement of any product or service by the Congress, the Government of the United States, of any Department, Agency or instrumentality thereof. This includes utilizing, in conjunction with the fact of their contractual relationship, images of the Capitol, any other buildings in the Capitol Complex, or any part of the United States Capitol Grounds in their advertising or promotional materials; and/or publishing or disseminating the aforementioned advertising or promotional materials.

(c) The Contractor, by signing this contract, agrees to comply with the foregoing and to submit any proposed advertising or promotional copy connected in any manner with this contract and/or the Capitol, other Capitol Complex Buildings, or the United States Capitol Grounds to the Contracting Officer for approval prior to publication.

(d) If this solicitation is for supplies or services, including construction, to be provided to or performed for the United States Supreme Court, the Contractor, by signing this contract, agrees that he or she will not advertise the award of the contract in his/her commercial advertising in such a manner as to state or imply that the Supreme Court of the United States endorses a product, project, or commercial line of endeavor.

(End of clause)

AOC52.203-2 DISCLOSURE OF INFORMATION TO THE GENERAL PUBLIC (JUN 2004)

(a) Promptly after receiving any request from the general public for information on or data derived from this contract, the contractor shall notify the Architect of the Capitol, Procurement Division. The contractor shall cooperate with the Procurement Division in compiling or collecting information or data if the Architect of the Capitol determines the information or data to be releasable.

(b) "General public", for purposes of this clause, are those groups or individuals who are not authorized by law or regulation to have access.

(c) This clause is not intended to prevent the contractor from providing contract information or data which the contractor is required to provide in order to conduct its business, such as insurance, banking, subcontracting.

(d) The contractor is permitted to request that proprietary information or data not be released if such release would harm or impair the contractor in conducting its normal business. Such request must be documented with clear and specific grounds for that claim.

(End of clause)

AOC52.204-1 PRINTED OR COPIED DOUBLE-SIDED ON RECYCLED PAPER (JUN 2004)

The Contractor is encouraged to submit paper documents, such as offers, letters, or reports, that are printed or copied doubled-sided on recycled paper and meet minimum content standards when not using electronic commerce methods to submit information or data to the Government.

(End of clause)

AOC52.211-3 DEFICIENCIES IN CONTRACT DOCUMENTS (JUN 2004)

The Contractor shall promptly inform the Contracting Officer, in writing, of any discovered errors, omissions, discrepancies, conflicts or ambiguities in the contract documents before proceeding with any work affected by such factors. Failure to do so will be at the risk of the Contractor.

(End of clause)

AOC52.211-6 NOTICE TO PROCEED (JUN 2004)

A formal notice, or notices, to proceed will be issued as soon as practical, normally after approval by the Contracting Officer of the bonds and insurance. Unless specifically authorized in writing, any steps taken

in connection with the performance of, or the preparation to perform, the contract, prior to issuance of the notice to proceed, will be the responsibility of and at the risk of the Contractor, and without any cost whatsoever to the Government.

(End of clause)

AOC52.215-10 EXAMINATION OF RECORDS (JUN 2004)

(a) The Contractor agrees that the Architect of the Capitol or any duly authorized representatives shall, until the expiration of 3 years after final payment under this contract, have access to and the right to examine any books, accounting procedures and practices documents, papers, records and other data regardless of whether such items are in written form, in the form of computer data or in any other form and other supporting evidence, involving transactions related to this contract or compliance with any clause or certification thereunder.

(b) The Contractor further agrees to include in all its subcontracts hereunder a provision to the effect that subcontractor agrees that the Architect of the Capitol or any authorized representatives shall, until the expiration of 3 years after final payment under the subcontract, have access to and the right to examine books, documents, papers, records other data regardless of whether such items are in written form, in the form of computer data or in any other form, and other supporting evidence, involving transactions related to the subcontract or compliance with any clause or certification thereunder.

(c) The term “subcontract” as used in this clause excludes purchase orders not exceeding $10,000.

(End of clause)

AOC52.215-11 AUDITS (JUN 2005)

(a) If the price of this contract is changed through the operation of any of the provisions of this contract, the Contractor, within such reasonable time as the Contracting Officer may direct, shall submit complete and accurate cost and pricing data in support of any claim asserted under such provisions.

(b) With the submission of cost and pricing data in support of any claim, the Contractor shall supply the following certification by a duly authorized corporate officer, partner, or owner, as applicable:

> "This is to certify that, to the best of my knowledge and belief, the cost and pricing data herewith submitted to the Contracting Officer in support of a price adjustment under Supplement/Claim No. for _____ (identify by description) are accurate and complete and they are current as of _____ (date).
> Date of Execution _____
> Firm _____
> Signature_____
> Title_____"

(c) The Contracting Officer in accordance with the FAR clause "Audit and Records - Negotiation", 52.215-2, has the right to examine all books, records, documents and other data of the Contractor or subcontractor in order to evaluate the accuracy, completeness, and currency of cost or pricing data thus submitted. The Contractor shall insert an appropriate provision in all subcontracts for the purpose of making the requirements of this paragraph applicable thereto.

(End of clause)

FAR 52.216-18 ORDERING (OCT 1995)

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from the date of the contract through the final day of the contract period.

(b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order or task order and this contract, the contract shall control.

(c) If mailed, a delivery order or task order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by facsimile, or by electronic commerce methods only if authorized in the Schedule.

(End of clause)

FAR 52.216-19 ORDER LIMITATIONS (OCT 1995)

(a) *Minimum order*. When the Government requires supplies or services covered by this contract in an amount of less than $2,500.00, the Government is not obligated to purchase, nor is the Contractor obligated to furnish, those supplies or services under the contract.

(b) *Maximum order*. The Contractor is not obligated to honor--

(1) Any order for a single item in excess of $2,000,000.00;

(2) Any order for a combination of items in excess of $5,000,000.00; or

(3) A series of orders from the same ordering office within 7 days that together call for quantities exceeding the limitation in paragraph (b)(1) or (2) of this section.

(c) If this is a requirements contract (*i.e.*, includes the Requirements clause at subsection 52.216-21 of the Federal Acquisition Regulation (FAR)), the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph

(b) of this section.

(d) Notwithstanding paragraphs (b) and (c) of this section, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within 7 days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

(End of clause)

FAR 52.216-22 INDEFINITE QUANTITY(OCT 1995)

(a) This is an indefinite-quantity contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies and services specified in the Schedule are estimates only and are not purchased by this contract.

(b) Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering clause. The Contractor shall furnish to the Government, when and if ordered, the supplies or services specified in the Schedule up to and including the quantity designated in the Schedule as the "maximum". The Government shall order at least the quantity of supplies or services designated in the Schedule as the "minimum".

(c) Except for any limitations on quantities in the Order Limitations clause or in the Schedule, there is no limit on the number of orders that may be issued. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.

(d) Any order issued during the effective period of this contract and not completed within that period shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; *provided*, that the Contractor shall not be required to make any deliveries under this contract after one year after the last day of the final contract period.

(End of clause)

AOC52.216-6 UNDEFINITIZED CONTRACT ACTIONS (MAR 2005)

(a) In the event of an urgent situation, the services or supplies may be required on an emergency basis under an undefinitized contract action (emergency task/delivery order, contract modification, or letter contract). The undefinitized contract action may be either verbal, typed, or hand written, with the form of the undefinitized contract action dictated by the access the issuing Contracting Officer has to the AOC network or a computer. If issued verbally, the Contracting Officer shall provide a written confirming

document to the location identified by the contractor within 5 calendar days after issuance of the verbal undefinitized contract action. If an undefinitized contract action is issued under an existing contract, the terms and conditions of the contract shall be in effect and automatically incorporated by reference under any undefinitized contract action issued.

(b) The scope of work as originally issued on the contract action will, of necessity, be somewhat broad and general in nature. It is to also be considered as a Notice to Proceed immediately with the work under the undefinitized contract action. An estimated amount for the work to be performed shall be obligated to ensure that reasonable funds are available for payment to the contractor, and an estimated completion date shall be identified on the undefinitized contract action. If the contractor believes the amount of funds obligated or time for completion as stated in the undefinitized contact action are unreasonable, within 30 calendar days after issuance of the written undefinitized contract action the contractor is responsible for notifying the Contracting Officer of this and providing a suggested amount of funds for obligation or time for completion. In no instance shall the contractor's suggested amount of funds for obligation or time for completion be considered as binding to the contractor or the Government in future negotiations. The Government can elect to use the contractor's suggested amount of funds or time for completion as an indication that some additional funds or time for completion may be required and obligated or adjusted, respectively, in order to ensure that reasonably adequate funds are available to pay the contractor for services performed or that the completion time is reasonable .

(c) Within a reasonable amount of time after the issuance of the undefinitized contract action but not later than an estimated 25% of the way through the completion of the work under the undefinitized contract action, an authorized representative of the contractor must meet, either in person or telephonically, with the Contracting Officer to further define the scope of work, negotiate the price, identify a final completion date, and address other activities necessary to definitize the undefinitized contract action. This estimated 25% shall use the best information reasonably available and be based upon (1) an estimate of the amount of work completed relative to the original general scope of work or (2) the amount of payments made relative to the original amount obligated.

(d) Payments can be made from the original amount obligated, but the undefinitized contract action must be definitized before payments exceed 40% of funds originally obligated.

(e) If communications are disrupted to the degree that it is necessary to communicate with the Contracting Officer at their residence or through other devices that do not utilize AOC-owned equipment, i.e., the Contracting Officer's residential telephone line, home address, etc., the contractor shall treat the Contracting Officer's personal information as confidential and shall not divulge the information to any individual or organization, including but not limited to other AOC personnel, without the Contracting Officer's express written permission. If it becomes necessary for the Contracting Officer to communicate with the contractor through means other than the contractor's normal place of business, i.e., the contractor's residential telephone line or home address, the Contracting Officer shall not divulge the information to any individual or organization, including but not limited to other AOC or contractor personnel, without the contractor's express written permission.

(f) For the purposes of this clause, e-mail, or written or electronically transmitted correspondence is considered express written permission.

(End of clause)

AOC52.219-1 UTILIZATION OF SMALL BUSINESS CONCERNS (AUG 2004)

(a) It is the policy of the Government as declared by the Congress that a fair proportion of the purchases and contracts for supplies and services for the Government be placed with all types of small business concerns as determined by the size standards in 13 CFR 121.

(b) The Contractor agrees to accomplish the maximum amount of subcontracting to all types of small business concerns that the Contractor finds to be consistent with the efficient performance of this contract.

(End of clause)

AOC52.222-1 OVERTIME WORK - CONSTRUCTION (AUG 2004)

No extra reimbursement will be allowed for work performed outside regular working hours or on Saturday, Sundays or holidays and, for work performed in the District of Columbia, Presidential Inauguration Day, unless such work is ordered in writing by the Contracting Officer and payment therefore is authorized in the written order, and provided such work is not otherwise required to be performed under terms of the contract.

(End of clause)

AOC52.222-3 CONVICT LABOR (JUN 2004)

In connection with the performance of work under this contract the Contractor agrees not to employ any person undergoing sentence of imprisonment except as provided by Public Law 89-176, approved September 10, 1965, 18 U.S.C. 4082(c)(2).

(End of clause)

AOC52.222-7 WORKMEN'S COMPENSATION LAWS (JUN 2004)

The Contractor and his subcontractors employed on the site shall comply with the Workmen's Compensation Laws of the District of Columbia, Maryland, and Virginia as required.

(End of clause)

FAR 52.223-3 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA (JAN 1997) ALTERNATE I (JULY 1995)

(a) "Hazardous material" as used in this clause, includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

(b) The offeror must list any hazardous material, as defined in Paragraph (a) of this clause, to be delivered under this contract. The hazardous material shall be properly identified and include any applicable identification number, such as National Stock Number or Special Item Number. This information shall also be included on the Material Safety Data Sheet submitted under this contract.

Material (If none, insert "None")	Identification No.
_____	_____
_____	_____
_____	_____

(c) This list must be updated during performance of the contract whenever the Contractor determines that any other material to be delivered under this contract is hazardous.

(d) The apparently successful offeror agrees to submit, for each item as required prior to award a "Material Safety Data Sheet", meeting the requirement of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous material identified in Paragraph (b) of this clause. Data shall be submitted in accordance with Federal Standard No. 313, whether or not the apparently successful offeror is the actual manufacturer of these items. Failure to submit the Material Safety Data Sheet prior to award may result in the apparently successful offeror being considered nonresponsible and ineligible for award.

(e) If, after award, there is a change in the composition of the items(s) or a revision to Federal Standard No. 313, which renders incomplete or inaccurate the data submitted under Paragraph (d) of this clause, the Contractor shall promptly notify the Contracting Officer and resubmit the data.

(f) Neither the requirements of this clause nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

(g) Nothing contained in this clause shall relieve the Contractor from complying with applicable Federal, State and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

(h) The Government's rights in data furnished under this contract with respect to hazardous material are

as follows:

(1) To use, duplicate and disclose any data to which this clause is applicable. The purposes of this right are to–

(i) Apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials;

(ii) Obtain medical treatment for those affected by the material; and

(iii) Have others use, duplicate and disclose the data for the Government for these purposes.

(2) To use, duplicate and disclose data furnished under this clause, in accordance with subparagraph (h)(1) of this clause, in precedence over any other clause of this contract providing for rights in data.

(3) The Government is not precluded from using similar or identical data acquired from other sources.

(i) Except as provided in Paragraph (i)(2), the Contractor shall prepare and submit a sufficient number of Material Safety Data Sheets (MSDS's), meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous materials identified in Paragraph.(b) of this clause.

(1) For items shipped to consignees, the Contractor shall include a copy of the MSDS's with the packing list or other suitable shipping document which accompanies each shipment. Alternatively, the Contractor is permitted to transmit MSDS's to consignees in advance of receipt of shipments by consignees, if authorized in writing by the Contracting Officer.

(2) For items shipped to consignees identified by mailing address as agency depots, distribution centers or customer supply centers, the Contractor shall provide one copy of the MSDS' in or on each shipping container. If affixed to the outside of each container, the MSDS's must be placed in a weather resistant envelope.

(End of clause)

AOC52.223-1 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA - SUPPLEMENT (JUN 2005)

(a) Except as provided in paragraph (c), the Contractor shall prepare and submit a sufficient number of Material Safety Data Sheets (MSDS's), meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous materials identified in FAR 52.223-3(b).

(b) For items shipped to consignees, the Contractor shall include a copy of the MSDS's with the packing list or other suitable shipping document which accompanies each shipment. Alternatively, the Contractor is permitted to transmit MSDS's to consignees in advance of receipt of shipments by consignees, if

authorized in writing by the Contracting Officer.

(c) For items shipped to consignees identified by mailing address as agency depots, distribution centers or customer supply centers, the Contractor shall provide one copy of the MSDS' in or on each shipping container. If affixed to the outside of each container, the MSDS's must be placed in a weather resistant envelope.

(d) For items provided to a construction site, the Contractor shall provide two copies of each MSDS. One copy shall be provided to the COTR in accordance with the Division 1 submittal requirements, and a second copy shall be kept in an MSDS binder on the job site.
(End of clause)

AOC52.223-3 SECURITY MARKINGS (JUN 2004)

(a) Before dissemination to subcontractors or other personnel, all AOC drawings and electronic copies thereof shall be considered at a minimum to be *sensitive but unclassified* (SBU). The following statement shall be imprinted on *each* page of drawings:

PROPERTY OF THE UNITED STATES GOVERNMENT
COPYING, DISSEMINATING, OR DISTRIBUTING THESE DRAWINGS, PLANS OR SPECIFICATIONS TO UNAUTHORIZED USERS IS PROHIBITED
Do not remove this notice
Properly destroy documents when no longer needed

(b) The following paragraph shall be included on the cover page of the information (such as the cover page on a set of construction drawings and on the cover page of the specifications).

PROPERTY OF THE UNITED STATES GOVERNMENT
COPYING, DISSEMINATING, OR DISTRIBUTING THESE DRAWINGS, PLANS OR SPECIFICATIONS TO UNAUTHORIZED USERS IS PROHIBITED
Do not remove this notice
Properly destroy documents when no longer needed

(End of clause)

AOC52.223-4 TRANSMISSION OR POSTING OF DRAWINGS/SPECIFICATIONS (JUN 2004)

Due to security issues, the contractor is strictly prohibited from placing or transmitting drawings and specifications on the internet or modem without express permission from the Architect of the Capitol.

(End of clause)

FAR 52.225-9 BUY AMERICAN ACT– CONSTRUCTION MATERIALS (JUNE 2003)

(a) *Definitions*. As used in this clause --

"Component" means an article, material, or supply incorporated directly into construction materials.

"Construction material" means an article, material, or supply brought to the construction site by the Contractor or a subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

"Cost of components" means–

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in Paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

"Domestic construction material" means–

(1) An unmanufactured construction material mined or produced in the United States, or

(2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

"Foreign construction material" means a construction material other than a domestic construction material.

"United States" means the 50 States, the District of Columbia, and outlying areas

(b) *Domestic preference.* (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) by providing a preference for domestic construction material. The Contractor shall use only domestic construction material in performing this contract, except as provided in Paragraphs (b)(2) and (b)(3) of this clause.

(2) This requirement does not apply to the construction material or components listed by the Government as follows:

_____

(Contracting Officer to list applicable excepted materials or indicate "None")

(3) The Contracting Officer may add other foreign construction material to the list in Paragraph (b)(2) of this clause if the Government determines that--

(i) The cost of domestic construction material would be unreasonable. The cost of a particular construction material subject to the requirements of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent;

(ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) *Request for determination of inapplicability of the Buy American Act*. (1)(i) Any contractor request to use foreign construction material in accordance with Paragraph (b)(3) of this clause shall include adequate information for Government evaluation of the request, including--

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with Paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in Paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain

why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination

(2) If the Government determines after contract award that an exception to the Buy American Act applies and the Contracting Officer and the contractor negotiates adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in Paragraph (b)(3)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act applies, use of foreign construction material is noncompliant with the Buy American Act or Balance of Payments Program.

(d) *Data*. To permit evaluation of requests under Paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers;

FOREIGN AND DOMESTIC CONSTRUCTION MATERIALS PRICE COMPARISON

Construction Material Description	Unit of Measure	Quantity	Price (Dollars)*
Item 1:			
Foreign construction material	_____	_____	_____
Domestic construction material	_____	_____	_____
Item 2:			
Foreign construction material	_____	_____	_____
Domestic construction material	_____	_____	_____

[List *name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.]*
[Include other applicable supporting information.]
[Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate is issued).]*

(End of clause)

AOC52.225-1 BUY AMERICAN ACT - SUPPLEMENT (JUN 2004)

In addition to provisions of the above clause entitled, "Buy American Act", the General Provisions of the

Legislative Branch Appropriations Act provides in part, as follows:

(a) It is the sense of the Congress that, to the greatest extent practicable, all equipment and products purchased with funds made available in the Act should be American-made.

(b) In providing financial assistance to or entering into any contract with, any entity using funds made available in the Act, the head of each Federal Agency, to the greatest extent practicable, shall provide to such entity a notice describing the statement made in Paragraph (a) above, by the Congress.

(End of clause)

AOC 52.228-2 INSURANCE - WORK ON A GOVERNMENT INSTALLATION (SEP 2004)

(a) The Contractor shall, at his own expense, provide and maintain during the entire performance of this contract at least the kinds and minimum amounts of insurance as required in this clause.

(b) Within twenty (20) calendar days after the date of contract award or before commencing work under this contract, whichever is earlier, the Contractor shall notify the Contracting Officer in writing that the required insurance has been obtained. A Certificate of Insurance evidencing the Contractor's compliance with the requirements of this clause, identifying all policies of insurance and sureties proposed for the provision of liability coverage pertinent to the work of the instant contract, including the endorsement required in this paragraph, and manually countersigned by an authorized representative of the insurance company shall be submitted in accordance with the time frame stated in this paragraph. All policies for liability protection, bodily injury, or property damage shall include the United States of America, acting by and through the Architect of the Capitol, as an additional insured with respect to operations under this contract. Each policy of insurance shall contain the following endorsement, which may be attached as a rider:

> "It is understood and agreed that the Contractor's Insurance Company or surety shall notify the Architect of the Capitol, in writing, thirty (30) calendar days in advance of the effective date of any reduction in or cancellation of this policy."

(c) Insurance and required minimum liability limits are:

(1) Appropriate bodily injury and property damage liability insurance, with limits of not less than $500,000 for each occurrence and $2,000,000 for annual aggregate, including requirements for protection of hoisting and scaffolding operations, when applicable, and servicing areas adjacent to the building;

(2) Automobile bodily injury liability insurance with limits of not less than $200,000 for each person and $500,000 for each accident, and property liability insurance, with a limit of not less than $20,000 for each accident. A combined single limit for these coverages is acceptable; and/or

(3) Workmen's compensation insurance as required by the laws of (1) the District of Columbia for

work performed on a Government site located in the District of Columbia; (2) the State of Maryland for work performed on a Government site located in Maryland; or (3) the Commonwealth of Virginia for work performed on a Government site located in Virginia.

(d) The Contractor shall insert the substance of this clause, including this paragraph, in subcontracts under this contract that require work on a Government installation, and shall require subcontractors to provide and maintain the insurance required in this clause. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

(End of clause)

AOC52.228-5 PERFORMANCE AND PAYMENT BONDS - CONSTRUCTION (SEP 2004)

(a) *Definitions*. As used in this clause, "original contract price" means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) *Amount of required bonds*. Unless the resulting contract price is $25,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance Bonds: (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) Payment Bonds: (Standard Form 25-A). The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(c) *Additional bond protection*. (1) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(2) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bonds or to obtain an additional bond.

(d) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in Item 12 of the form entitled, "Solicitation, Offer, and Award (Construction, Alteration, or Repair)" or otherwise specified by the Contracting Officer, but in any event, before starting work.

(e) Surety or other security for bonds. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, or by

other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW, 2nd Floor, West Wing, Washington, DC 20227.

(f) Notice of subcontractor waiver of protection (40 U.S.C. 270 b(c). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.

(End of clause)

AOC52.228-6 NOTICE TO SURETIES (JUN 2004)

The final inspection and acceptance of the work included in this contract shall not be binding or conclusive upon the Government if it shall subsequently appear that the Contractor has willfully or fraudulently, or through collusion with the representatives of the Government in charge of the work, supplied inferior material or workmanship, or has departed from the terms of the contract, or if defects of any kind should develop during the period that the guarantees covering such material and workmanship are in force. In such event, the Government shall have the right, notwithstanding such final acceptance and payment, to have the work removed and to cause the work to be properly performed and satisfactory material supplied to such extent as, in the opinion of the Contracting Officer, may be necessary to finish the work in accordance with the drawings, if any, and specifications, at the expense of the Contractor and the sureties on its bond, and the Government shall have the right to recover against the Contractor and its sureties the cost of such work, together with such other damages as the Government may suffer because of the default of the Contractor in the premises, the same as though such acceptance and final payment had not been made.

(End of clause)

FAR52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (SEP2002)

(a) *Payment of price*. The Government shall pay the Contractor the contract price as provided in this contract.

(b) *Progress payments*. The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer.

(1) The Contractor's request for progress payments shall including the following substantiation:

(i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested;

(ii) A listing of the amount included for work performed by each subcontractor under the contract;

(iii) A listing of the total amount of each subcontract under the contract;

(iv) A listing of the amounts previously paid to each such subcontractor under the contract;

(v) Additional supporting data in a form and detail required by the Contracting Officer.

(2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if--

(i) Consideration is specifically authorized by this contract; and

(ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.

(c) *Contractor certification*. Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete Paragraph (c)(4) from the certification, the certification is still acceptable.)

I hereby certify, to the best of my knowledge and belief, that--

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;

(2) All payments due to subcontractors and suppliers from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of Chapter 39 of Title 31, United States Code;

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and

(4) This certification is not to be construed as final acceptance of a subcontractor's performance.

_____

(Name)

_____

(Title)

_____

(Date)

(d) Refund of unearned amounts. If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the "unearned amount"), the Contractor shall - -

(1) Notify the Contracting Officer of such performance deficiency; and

(2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until - -

(i) The date the Contractor notifies the Contracting Officer that the performance deficiency
has been corrected; or

(ii) The date the contractor reduces the amount of any subsequent certified request for progress progress payments by an amount equal to the unearned amount.

(e) *Retainage*. If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.

(f) *Title, liability, and reservation of rights.* All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as--

(1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or

(2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(g) Reimbursement for bond premiums. In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.

(h) *Final payment*. The Government shall pay the amount due the Contractor under this contract after--

(1) Completion and acceptance of all work;

(2) Presentation of a properly executed voucher; and

(3) Presentation of release of all claims against the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 3727 and 41 U.S.C. 15).

(i) Limitation because of undefinitized work. Notwithstanding any provision of this contract, progress payments shall not exceed 80 percent on work accomplished on undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative

(j) Interest computation on unearned amounts. In accordance with 31 U.S.C. 390(c)(1), the amount payable under paragraph (d)(2) of this clause shall be --

(1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date of the Contractor receives the unearned amount; and;

(2) Deducted from the next available payment to the Contractor.

(End of clause)

AOC52.232-6 PAYMENT BY ELECTRONIC FUNDS TRANSFER - OTHER THAN CENTRAL CONTRACTOR REGISTRATION (JUN 2004)

(a) *Method of payment*. (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT) except as provided in paragraph (a)(2) of this clause. As used in this clause, the term "EFT" refers to the funds transfer.

(2) In the event the Government is unable to release one or more payments by EFT, the contractor agrees to either--

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to delay payment until such time as the Government makes payment by EFT (but see paragraph (d)).

(b) *Mandatory submission of Contractor's EFT information*. (1) The Contractor is required to provide

the Government with the information required to make payment by EFT (see paragraph (i) of this clause). The contractor shall provide this information directly to the office designated in paragraph (k) to receive that information (hereafter: "designated office") by three working days after notification of contract award. If not otherwise specified in this contract, the payment office is the designated office for receipt of the contractor's EFT information. If more than one designated office is named for the contract, the contractor shall provide a separate notice to each office. In the event that the EFT information changes, the contractor shall be responsible for providing the updated information to the designated office(s).

(2) If the contractor provides EFT information applicable to multiple contracts, the contractor shall specifically state the applicability of this EFT information in terms acceptable to the designated office. However, EFT information supplied to a designated office shall be applicable only to contracts that identify that designated office as the office to receive EFT information for that contract.

(c) *Mechanisms for EFT payment.* The Government may make payment by EFT through the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.

(d) *Suspension of payment.* (1) Notwithstanding the provisions of any other clause of this contract, the Government is not required to make any payment under this contract until after receipt, by the designated payment office, of the correct EFT payment information from the Contractor. Until receipt of the correct EFT information, any invoice or contract financing request shall be deemed not to be a valid invoice.

(2) If the EFT information changes after submission of correct EFT information, the Government shall begin using the changed EFT information no later than the 30 days after its receipt by the designated office to the extent payment is made by EFT. However, the Contractor may request that no further payments be made until the changed EFT information is implemented by the payment office.

(e) *Liability for uncompleted or erroneous transfers*. (1) If an uncompleted or erroneous transfer occurs because the Government failed to use the Contractor-provided EFT information in the correct manner, the Government remains responsible for--

(i) Making a correct payment; and

(ii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because Contractor's EFT information was incorrect at the time of Government release or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment and the provisions of paragraph (d) shall apply.

(f) *EFT and assignment of claims*. If the contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the contractor shall require as a condition of any such assignment that the assignee shall provide the EFT information required by paragraph (i) of this clause to the designated office and shall be paid by EFT in accordance with the terms of this clause. In all respects, the requirements of this clause shall apply to the assignee as if it were the contractor. EFT information that shows the ultimate recipient of the transfer to be other than the contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of Paragraph (d) of this clause.

(g) *Liability for change of EFT information by financial agent.* The Government is not liable for errors resulting from changes to EFT information provided by the contractor's financial agent.

(h) *Payment information.* The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address in the contract.

(i) *EFT Information*. The contractor shall provide the following information to the designated payment office. The contractor may supply this data for this or multiple contracts (see paragraph (b) of this clause). The Contractor shall designate a single financial agent per contract capable of receiving and processing the EFT information using the EFT methods described in paragraph (c) of this clause. The information required is as follows:

(1) The contract number;

(2) The contractor's name and remittance address as stated in the contract(s);

(3) The signature (manual or electronic, as appropriate), title, and telephone number of the contractor's official authorized to provide this information;

(4) The name, address, and 9-digit Routing Transit Number of the contractor's financial agent; and

(5) The contractor's account number and the type of account (checking, saving or lockbox).

(j) The Contractor shall send all EFT information, and any changes to EFT information to the office designated in paragraph (k) of this clause. The Contractor shall not send EFT information to the payment office, or any other office than that designated in paragraph (k). The Government need not use any EFT information sent to any office other than that designated in paragraph (k).

(k) Designated office:

Name:

Architect of the Capital
Accounting Division
Mailing Address:
2nd and D Streets SW
Ford House Office Building
Washington, DC 20515
Telephone:
(202) 226-2552
Facsimile:
(202) 225-7321

(End of clause)

AOC52.232-9 PAYMENT OF INTEREST ON CONTRACTOR CLAIMS (JUN 2004)

(a) If an appeal is filed by the Contractor from a final decision of the Contracting Officer under the Disputes paragraph of this contract, denying a claim arising under the contract, simple interest on the amount of the claim finally determined owed by the Government shall be payable to the Contractor. Such interest shall be at the rate determined by the Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat. 97, from the date the Contractor furnishes to the Contracting Officer his written appeal under the Disputes paragraph of this contract, to the date of (1) a final judgement by a court of competent jurisdiction, or (2) mailing to the Contractor of a change order, or a supplemental agreement for execution either confirming completed negotiations between the parties or carrying out a decision of a contract appeals board.

(b) Notwithstanding Paragraph (a) above, (1) interest shall be applied only from the date payment was due, if such date is later than the filing of appeal, and (2) interest shall not be paid for any period of time that the Contracting Officer determines the Contractor has unduly delayed in pursuing his remedies before a board of contract appeals or a court of competent jurisdiction.

(End of clause)

AOC52.232-12 ASSIGNMENT - SUPPLEMENT (MAR 2005)

Neither the contract nor any interest therein shall be assigned. However, moneys due or to become due under the contract may be assigned in accordance with the provisions of FAR clause 52.232-23 ASSIGNMENT OF CLAIMS.

(End of clause)

AOC52.233-1 DISPUTES (JUN 2004)

(a) Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall

reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Contracting Officer shall be final and conclusive unless, within 30 days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the head of the agency involved. The decision of the head of the agency or his duly authorized representative for the determination of such appeals shall be final and conclusive. This provision shall not be pleaded in any suit involving a question of fact arising under this contract as limiting judicial review of any such decision to cases where fraud by such official or his representative or board is alleged; **provided, however**, that any such decision shall be final and conclusive unless the same is fraudulent or capricious or arbitrary or so grossly erroneous as necessarily to imply bad faith or is not supported by substantial evidence. In connection with any appeal proceeding under this paragraph, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of his appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

(b) This paragraph does not preclude consideration of questions of law in connection with decisions provided for in Paragraph (a) above. Nothing in this contract, however, shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

(End of clause)

AOC52.233-2 CLAIMS FOR EQUITABLE ADJUSTMENTS - WAIVER AND RELEASE OF CLAIMS

(JUN 2004)

(a) Whenever the Contractor submits a claim for equitable adjustment under any paragraph of this contract which provides for equitable adjustment of the contract, such claim shall include all types of adjustments in the total amounts to which the paragraph entitles the Contractor, including but not limited to adjustments arising out of delays or disruptions or both caused by such change. Except as the parties may otherwise expressly agree, the Contractor shall be deemed to have waived (1) any adjustments to which it otherwise might be entitled under the paragraph where such claims fail to request such adjustments, and (2) any increase in the amount of equitable adjustments additional to those requested in its claim.

(b) Further, the Contractor agrees that, if required by the Contracting Officer, he will execute a release, in form and substance satisfactory to the Contracting Officer, as part of the supplemental agreement setting forth the aforesaid equitable adjustment, and that such release shall discharge the Government, its officers, agents and employees, from any further claims, including but not limited to further claims arising out of delays or disruptions or both, caused by the aforesaid change.

(End of clause)

AOC52.233-3 LIMITATION ON DAMAGES FOR DELAY (JUN 2004)

(a) The Architect shall not be obligated or liable to the Contractor for, and the Contractor hereby expressly waives any claims against the Architect on account of any damages, of any nature whatsoever,

which the Contractor, or its subcontractor at any tier may incur as a result of delays, interferences, disruptions, suspensions, changes in sequence or the like arising from or out of any act or omission of the Architect, it being understood and agreed that the Contractor's sole and exclusive remedies in such event shall be a reimbursement of direct costs necessarily incurred as a result of the foregoing causes, and an extension of the contract time, but only in accordance with the provisions of the Contract Documents.

(b) For the purposes of this clause, the term "Damages" shall include all indirect and/or impact costs which shall include, without limitation: unabsorbed Home Office Overhead (including calculations under the "Eichleay Formula"), Idle Labor and Equipment, Loss of Productivity, and Interest; the term "Damages" shall not include on-site direct costs, which shall include direct labor (superintendence, labor, time-keeping, and clerical work) direct materials and supplies (including material handling), direct equipment, restoration and cleanup, overhead and profit (but only as permitted under the clauses "Changes" and "Changes - Supplement", taxes, insurance, and bonding costs, which will be calculated in accordance with the clauses "Changes" and "Changes - Supplement". Provided, however, that the accounting practice of treating these costs as "direct" shall be in accordance with

(1) The Contractor's established and consistently followed cost accounting practices for all work; and

(2) FAR Cost Accounting Cost Principles and Procedures (FAR Part 31).

(c) To the extent that any other provision of this contract provides for the payment of damages, as defined in this clause, to the Contractor and is thus inconsistent with the provisions of this clause, such other provision will be superseded hereby with respect to the issue of damages.

(End of clause)

FAR 52.236-5 MATERIALS AND WORKMANSHIP (APR 1984)

(a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for

approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

(End of clause)

FAR 52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(b) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

(End of clause)

AOC52.236-1 ACCESS TO WORK (JUN 2004)

(a) The Contracting Officer or his representative may visit and inspect the Contractor's plant, without advance notice, at any time during the course of this contract, and he shall be granted every available assistance to facilitate such inspection.

(b) The Contracting Officer and proper members of his staff shall at all times have access to the work, and the Contractor shall provide proper and safe facilities for such access and for inspection.

(End of clause)

AOC52.236-2 OTHER CONTRACTS AND WORK (JUN 2004)

(a) The Contractor shall fully inform himself as to conditions relating to construction and labor under

which other work, if any, is being performed, or is to be performed, by or for the Government, by contract or otherwise, where such work may affect or be affected by, operations under this Contract.

(b) Notwithstanding the performance by other parties of work at the site during performance of this contract, the Contractor shall prosecute the work diligently and continuously, and he shall cooperate in every way with such other parties. The Contractor shall give such other parties, to the extent their work is affected by his work, all information necessary for the proper execution of their work, without delay. The Contractor shall so arrange and conduct his work that other parties may complete their work at the site according to schedule. All other work under the instant contract shall be carefully coordinated with work under such other contracts.

(End of clause)

AOC52.236-3 ACCIDENT PREVENTION AND SAFETY AND HEALTH PROGRAMS - CONSTRUCTION (SEP 2004)

(a) The Contractor shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others and comply with the safety and health standards published in 41 C.F.R. Part 50-205, including any matters incorporated by reference therein. He shall also be responsible for all materials delivered and work performed until completion and final acceptance of the entire contract work, except for any completed unit thereof which theretofore may have been finally accepted.

(b) *Williams-Steiger Occupational Safety and Health Act.* The Contractor shall also comply in all aspects of the job with the regulations issued by the Secretary of Labor pursuant to the Williams-Steiger Occupational Safety and Health Act of 1970, as set forth in Title 29 of the Code of Federal Regulations. The Contractor shall bring to the attention of the Architect any work encountered which may involve entry into a suspected confined space as defined by OSHA. A determination will be made by the Architect, and if the area is deemed a permit required confined space, additional protective measures will be needed, per OSHA requirements.

(c) *National Fire Protection Association standards.* The Contractor shall comply with all applicable standards of the National Fire Protection Association relative to fire prevention, except to the extent that more exacting requirements are specified or imposed by the Contracting Officer. The Contractor shall keep and properly maintain fire prevention devices at the job site and shall take all possible precautions deemed necessary by the Government representative in charge of the work.

(d) *Protection of property and persons.* (1) The Contractor shall protect all of his material and work at the site, whether incorporated in the work or not, against damage or loss from any cause, and he shall take all necessary precautions against damage to all other work and material on the site. He shall provide and maintain necessary safeguards for protection of his employees, Government employees and the public generally, and he shall take all other proper precautions for their protection against injury. He shall comply with all directives and regulations of the Contracting Officer and other proper authorities relative to the use of public property.

(2) The Contractor shall protect all electric, telephone, computer facilities, water, gas, sewer,

steam and other underground utility lines, in sidewalks, streets or other areas in, under or around the site, to the satisfaction of the Contracting Officer, the Government of the District of Columbia, and all other authorities having jurisdiction.

(3) The performance of work at the site by other parties shall not relieve the Contractor from any liability for loss or damage or from his obligations under this contract. No agreement or arrangement between the Contractor and others as to a division or proportionate share of liability for loss or damage incurred, or of the cost of insurance, shall in any way relieve the Contractor of such liability or his obligations under this contract.

(e) The Contractor shall comply with the requirements of FAR 52.236.13, Accident Prevention. In the event that conditions on the site pose an imminent danger or threat to the Contractor's workers, the public, Government employees, other persons, or to Capitol complex structures and property of historical significance, the Contracting Officer can verbally order the Contractor to suspend work operations in the specified area until said conditions are corrected to the Contracting Officer's satisfaction. The Contracting Officer shall promptly issue a written order to suspend the work to the Contractor formalizing the specifics of the verbal suspension of work.

(f) The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

(End of clause)

AOC52.236-4 CUTTING AND PATCHING (JUN 2004)

Prior to initiation of the work operations of either cutting or patching, as a necessary requirement of the work under this contract, of any structural component or of lintels, stair systems, piping, duct work, vessels, equipment and like items in the building, the Contractor shall consult with the Contracting Officer and follow explicitly his directions and stated requirements concerning methods, materials, the manner in which the work is performed, and the level of competence and skill possessed by Contractor's employees, or those of subcontractors, who are proposed to be employed in said cutting and/or patching operations.

(End of clause)

AOC52.236-5 CLEANING AND RESTORING (JUN 2004)

(a) The contractor shall remove dirt and debris resulting from the operations under this contract daily.

(b) The Contractor shall, as a condition precedent to the final acceptance of the work, remove from the site of the work all remaining plant, installations, temporary barricades, temporary facilities, equipment, tools, materials, refuse, rubbish and waste, used or accumulated in connection with, but not incorporated in, the work, unless otherwise specified or directed, and he shall leave the buildings, grounds, streets, and all public places occupied by him in a thoroughly clean, neat and satisfactory condition.

(End of clause)

AOC52.236-8 SCHEDULING OF WORK (AUG 2004)

(a) The Contractor shall, before commencing work on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of partial payments until the Contractor submits the required schedule.

(b) The Contractor shall furnish sufficient forces, construction plant and equipment, and shall work such hours as necessary to insure prosecution of work in accordance with the approved schedule. If, in the opinion of the Contracting Officer, the Contractor falls behind in the scheduled progress, the Contractor shall take such steps as may be necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained. The provisions of this subparagraph shall not be construed as prohibiting work on Saturdays, Sundays and holidays and, for work performed in the District of Columbia, Presidential Inauguration Day, if the Contractor so elects and if approved.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this contract.

(End of clause)

AOC52.236-9 SCHEDULE OF VALUES (JUN 2004)

(a) The Contractor shall, in accordance with the requirements of the Contracting Officer, prepare and submit for approval a schedule of estimated values of all parts of the work, and shall submit such quantity breakdowns pertinent thereto as the Contracting Officer may deem necessary for the proper checking of partial payment requisitions and for other administrative purposes. The total of the schedule of values shall equal the amount of the contract. The values employed in making this schedule will be used only for determining partial payments; they will not be used as a basis for determining an increase or decrease in the contract price. The listings and subdivisions of this schedule for estimated costs and quantity breakdowns shall be as approved by the Contracting Officer.

(b) The submission and approval of the schedule of values shall be a condition precedent to the making of

partial payments.

(End of clause)

AOC52.236-10 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (JUN 2004)

(a) The Contractor shall keep on the site of the work a copy of the drawings and specifications, and of approved shop drawings, product data and samples and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, or in case of discrepancy either within the figures, within the drawings, or within the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information he considers necessary, unless otherwise provided.

(b) "Shop drawings" means drawings submitted to the Government by the Contractor, subcontractor, any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract.

(c) The Contractor shall submit to the Contracting Officer for approval shop drawings, product data and samples as required under the various sections of this Project Manual. The Contractor shall coordinate all such submittals, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings, product data, or samples submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for re-submission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such submittals, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with Paragraph (d) below.

(d) If shop drawings, product data, or samples show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(e) Upon completing the work under this contract, the Contractor shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the equipment is completed and accepted. The Government may duplicate, use, and disclose in any manner

and for any purpose shop drawings, product data or samples delivered under this contract.

(f) The provisions of this entire paragraph shall be included in all subcontracts at any tier.

(End of clause)

AOC52.236-12 PRODUCT DATA AND SAMPLES (JUN 2004)

(a) Product data shall mean information (e.g., catalog cuts, standard illustrations, drawings, performance charts, data and brochures) pertinent to a particular product, equipment or material required as a part of the work. Product data is required to establish, for the purposes of evaluation and approval, details of the product offered in response to specifications elsewhere in the contract documents. Product data pertains to significant elements such as (1) design; (2) materials; (3) components; (4) performance characteristics; and (5) methods of manufacture, assembly, construction, or operation. The term includes, in addition to the above, the manufacturer's standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies, and the application of their labels and seals (if any).

(b) Samples are physical examples of materials, equipment or workmanship that will be used by the Contracting Officer to establish standards by which the work will be judged.

(c) Samples not subject to destructive tests may be retained by the Contracting Officer until completion of the work; they will then be returned to the Contractor, at his own expense, if he so requests in writing.

(End of clause)

FAR 52.242-14 SUSPENSION OF WORK (APR 1984)

(a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of the contract, or (2) by the Contracting Officer’s failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this Article for any suspension, delay or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract.

(c) A claim under this article shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim,

in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

(End of clause)

FAR 52.243-4 CHANGES (AUG 1987)

(a) The Contracting Officer may, at any time, without notice to the sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes-

(1) In the specifications (including drawings and designs);

(2) In the method or manner of performance of this work;

(3) In the Government-furnished facilities, equipment, materials, services, or site; or

(4) Directing acceleration in the performance of the work.

(b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; Provided, that the Contractor gives the Contracting Officer written notice stating-

(1) The date, circumstances, and source of the order; and

(2) That the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no adjustment for any change under paragraph (b) of this clause shall be made for any costs incurred more than 20 days before the Contractor gives written notice as required. In the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting to the Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of the proposal for adjustment may be included in the notice under paragraph (b) of this clause.

(f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract

(End of Clause)

AOC52.243-1 CHANGES - SUPPLEMENT (JUN 2004)

(a) *Definitions.* (1) A "change order" is a unilateral contract modification, signed by the Contracting Officer, which describes and identifies a particular change in the requirements as permitted by the FAR clause, 52.243-4, "Changes" and authorizes the contractor to begin performance with the changed requirements. The change order may reference pertinent oral or written directives, provide an adjustment to the contract price and/or time for performance, and direct the contractor to submit a proposal for definitization of the change order.

(2) A "supplemental agreement" is a bilateral contract modification, signed by the contractor and the Contracting Officer, which either authorizes the contractor to begin performance with the changed requirements in accordance with the equitable adjustment agreed to prior to commencement of performance of the changed requirements or definitizes a change order after agreement of an equitable adjustment to the contract.

(3) Request for Proposal. A request by the Contracting Officer or his duly authorized representative for the contractor to submit a proposal for requirements contemplated to be changed. Such proposal shall be submitted within the time limit specified in the request and in accordance with the requirements and limitations of this clause.

(b) *Authorization of changes***.** All changes to contract requirements will be authorized in writing by the Contracting Officer through one of the following methods:

(1) A Supplemental Agreement, with the concurrence of the contractor; or

(2) A unilateral Change Order.

(c) *Submission of proposals and cost breakdowns by the contractor.*

(1) Proposals for changes to the contract requirements shall include a brief description of the change; a breakdown of costs as outlined hereinafter; and a time impact analysis (fragnet).

(2) In considering proposals for changes involving added requirements, omitted requirements, or any combination thereof, the Contracting Officer or his duly authorized representative will make check-estimates in such detail as he deems necessary with the view of arriving at equitable adjustments. With each proposal, the contractor shall submit separately an itemized breakdown as per "Exhibit A" hereof, which shall include, but not be limited to, the following:

(i) Direct labor costs;

(ii) Social Security and Unemployment Insurance Taxes;

(iii) Workmen's compensation and general liability insurance;

(iv) Direct material quantities and unit prices (separated into trades);

(v) Construction equipment;

(vi) Overhead; and

(vii) Profit.

(3) If the contractor believes that the change in the contract requirements affects the contract period of performance, as required by AOC52.211-5, Commencement, Prosecution, and Completion of Work, of the Supplementary Conditions, appropriate substantiation must be submitted for evaluation/review.

(4) A complete proposal, including breakdown of cost and time impact, shall be submitted by the contractor within the time frame stipulated in calendar days by the Government for each proposed change. Generally, complete proposals shall be submitted by the contractor within 7 calendar days after the contractor receives the request for proposal, although this time frame may be adjusted for more complex or more urgent requirements. Except as provided by an individual contract modification, no payment for a change order will be made until a supplemental agreement has been signed by the contractor and the Contracting Officer. If complete proposals are not received timely, the Contracting Officer, after consultation with his authorized representative, may determine the cost of the change and the time impact and issue a change order based upon this determination with the stipulation that if a supplemental agreement is not negotiated within a reasonable amount of time, this determination will be final and conclusive, subject only to the contractor's rights of appeal as provided in AOC52.233-1, Disputes, of the General Conditions.

(d) *Allowances for overhead and profit.* (1) The following percentages will be allowed for overhead and profit:

(i) The contractor shall receive, as a percentage of the cost of all work performed by his own organization, an amount not to exceed 10% overhead and not to exceed 10% profit; and

(ii) If subcontractor(s) are involved in the change, a fee in an amount not to exceed 10% as a percentage of the total price of the subcontractor portion of the change.

(iii) Subcontractor(s) to the prime contractor (first tier subcontractor(s)) shall receive, as a percentage of the cost of all work performed by or for it, a total amount not to exceed 10% overhead and not to exceed 10% profit.

(iv) The percentages for fees, overhead, and profit permitted by the above shall be allowed only for the contractor and its first tier subcontractors. Percentages for fees, overhead, and profit in any

amount will not be allowed for subcontractors of any other tier.

(2) Percentages for overhead allowed are deemed to include, but shall not be limited to, the following:

(i) Field Overhead Items.

(A) Trailer;

(B) Storage Facilities;

(C) Contractor's and subcontractor's superintendence;

(D) Construction equipment/tools, except those that are specially required for a specific change;

(E) Utilities;

(F) Contractor's and subcontractor's field office, administrative/support staff;

(G) Cost of preparing record drawing changes, correspondence, etc., relating to the contract;

(H) Job site safety aids; and

(I) Cleaning and maintenance of nuisance debris from jobsite.

(ii) Office Overhead Items for Contractor and Subcontractors.

(A) Maintenance/operation of principal or branch offices;

(B) Personnel costs;

(C) Cost for preparing correspondence, fragnets, etc., relating to the contract; and

(D) Cost of insurance and bonds, except for insurance costs relating to direct labor, as outlined in "Exhibit A" .

(iii) For changes which include custom items unique to the project and which are fabricated off-site, the fabricator, whether the contractor or a subcontractor at any tier, shall furnish a breakdown of costs associated with the work in the fabricating plant. This breakdown shall include labor, material, equipment and overhead/plant costs in sufficient detail to allow for review by the Contracting Officer or his duly authorized representative. Costs charged to overhead/plant shall be allowable costs for the fabricator, whether he is the contractor or a subcontractor at any tier, provided that the costs claimed are consistent

with the provisions of Subpart 31.203 of the Federal Acquisition Regulation (Chapter 1, Title 48, Code of Federal Regulations). An amount not to exceed 10% of the cost of the fabricated item will be allowed for the fabricator's profit. If the fabricator is a subcontractor, the overhead and profit percentages for the contractor and any subcontractor at a higher tier having a contractual relationship with the fabricator shall be allowed in accordance with this clause.

(e) *Changes involving decreases in price.* For changes involving only a decrease in price, the contractor and subcontractors shall return as credit for overhead and profit those same percentages which are allowed for like changes involving increases in price. On changes involving both an increase and a decrease in price, overhead and profit will be allowed only on the net increase.

(f) *Changes involving increases or decreases on basis of contract specified unit prices.* No percentages for overhead and profit will be added to, or deleted from, any unit prices in event of an increase or decrease in the contract requirements on the basis of contractual unit prices.

EXHIBIT A
TYPICAL FORM OF BREAKDOWN FOR PRICE ADJUSTMENT

SUBCONTRACTORS' BREAKDOWN

Items Involved	**Quan-tities**	**Unit Cost**	**Equip-ment**	**Material**	**Labor**	**Extensions**		**Unit Cost**
						Totals	**Final Totals**	
Excavation (Identify)								
• Volume								
• Crane Operator								
• Laborers								
Shoring (Identify)								
• Area								
• Welder								
Subcontractor Total								

PRIME CONTRACTOR'S BREAKDOWN

Items Involved	Quan-tities	Unit Cost	Equip-ment	Material	Labor	Extensions		Unit Cost
						Totals	Final Totals	
West Wall (Cinder Block)								
• Area								
• Block 8x8x16								
• Mortar								
• Mason								
• Laborer								
Subtotal								
Prime Contractor's Total								
Prime Contractor's Overhead and Profit on Subcontractor								
Total								

AOC52.244-1 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK (SEP 2005)

(a) The Contractor is responsible for coordination of all work performed by its own workforce and those of its subcontractors. Each subcontractor shall be experienced in and capable of performing in a satisfactory manner all work in his/her speciality, and shall meet the standard of competence established for the Contractor.

(b) The Contractor shall be responsible for all acts of subcontractors employed by him under this contract, and for their compliance with all terms and provisions of the contract applicable to their performance. The Contractor shall continuously coordinate the work of all sub-contractors to assure proper processing and progress of the Work. The Contractor shall require each subcontractor to (1) examine the project schedule, shop drawings and the work of other trades and all sections of the specifications to the extent

necessary for satisfactory installation of his work, and connection between his work and the work of other trades; (2) coordinate his work accordingly; and (3) cooperate with other trades toward timely and satisfactory completion of the entire Work.

(c) Organization of the specifications into sections and subsections and the arrangement of drawings shall not control the Contractor in dividing work among subcontractors or in establishing the extent of work to be performed by any trade.

(d) The Government reserves the right to require dismissal of any subcontractor who, by reason of previous unsatisfactory work on AOC projects or for any other reason, is considered by the Contracting Officer to be incompetent or otherwise objectionable for performing work under this contract.

(e) Nothing contained in the contract documents shall create any contractual relations between any subcontractor and the Government.

(End of clause)

AOC52.245-2 GOVERNMENT-FURNISHED PROPERTY (NOV 2004)

(a) For the purposes of this clause, Government-furnished "property" includes cell phones and telephones, personal digital assistants, computers (including laptops), electronic devices, services such as network access, tools, furnished space, storage, utilities, furnishings, equipment, and any other item or service provided by the AOC to the contractor.

(b) No AOC equipment or property can be provided under this contract unless specifically negotiated as part of the award price. If, after contract award, it becomes necessary or advisable to issue AOC property to the contractor, the contract price shall be reduced by a reasonable amount that reflects the price the contractor would pay if providing the property.

(c) The Contracting Officer's Technical Representative (COTR) for this contract is responsible for coordinating the issuance and return of Government-furnished property.

(d) Any Government-furnished property provided to the contractor for use during performance of this contract shall be issued to the contractor's representative and recorded on AOC Form 1423, AOC PROPERTY ISSUED TO CONTRACTORS. The contractor's representative shall be responsible for the ensuring the proper care and use of the Government-furnished property, whether used by the contractor representative or another contractor employee. Government-furnished property provided by the AOC can be used only for the conduct of official business on behalf of the AOC. The contractor is specifically prohibited from using AOC-furnished property for personal use or to conduct operations that benefit other Government agency contracts or other contractor activities that do not directly support AOC contracts.

(e) All information technology property that requires interface or connection to the AOC network must be provided by the AOC. The use of non-AOC IT property that requires interface or connection to the AOC network is strictly prohibited.

(f) All contractor employees who require access to the AOC network or who are issued a personal digital assistant must complete and sign the "Non-disclosure Agreement for Contract Employees Conditional Access to Sensitive but Unclassified Information for The Architect of The Capitol" before access will be granted. The COTR is responsible for providing the non-disclosure agreements to the AOC Office of Information Resources Management.

(g) All Government-furnished property shall be returned by the contractor to the COTR in the same condition as issued, with allowances for wear and tear that occurs with reasonable care and use. Failure to return Government-furnished property or the return of Government-furnished property that has not been properly maintained and used may result in a reduction to the contract price that reflects the market replacement value of the property or the market price to repair or restore the property to its condition when issued to the contractor.

(End of clause)

AOC52.246-1 FINAL INSPECTION AND ACCEPTANCE - CONSTRUCTION - SUPPLEMENT (SEP 2005)

(a) No inspection or other action of the Government shall be construed to constitute a final acceptance of any portion of the work under this contract until all work under the contract is completed. None of the work under the contract shall be deemed to be finally accepted until the Contractor, upon completion and final inspection of all work, is notified in writing of final acceptance of work under the contract, or in lieu thereof, until final payment of the final voucher as prescribed in FAR 52.232-5, Payments Under Fixed-Price Construction Contracts. The provisions of FAR clause 52.246-12, Inspection of Construction are hereby modified by the provisions of this paragraph with respect to the finality of acceptance of any portion of the work by the Government prior to completion of all work under the contract.

(b) The Contractor shall notify the Contracting Officer, at least 10 days in advance, of the date the work will be fully complete and ready for final inspection. Any additional costs incurred by the Government due to necessary reinspection of work found not ready for final inspection upon the Contractor's notice of completion will be charged to the Contractor and deducted from the contract price.
(End of clause)

AOC52.246-6 ADDITIONAL WARRANTY COVERAGE (JUN 2004)

If the Contractor receives from any manufacturer, supplier or subcontractor additional warranty coverage on the whole or any component of the work required by this contract, in the form of time including any pro rata arrangements, or the Contractor generally extends to his commercial customers a greater or extended warranty coverage, the Government shall receive corresponding warranty benefits.

(End of clause)

FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were

given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these addresses: www.gsa.gov or www.govcon.com

CLAUSE TITLE	DATE	FAR NUMBER
GRATUITIES	APR 1984	52.203-3
COVENANT AGAINST CONTINGENT FEES	APR 1984	52.203-5
RESTRICTIONS ON SUBCONTRACTOR SALES TO THE GOVERNMENT	JUL 1995	52.203-6
ANTI-KICKBACK PROCEDURES	JUL 2005	52.203-7
CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY	JAN 1997	52.203-8
PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT	JAN 2005	52.209-6
AUDIT AND RECORDS - NEGOTIATION	JUN 1999	52.215-2
CONTRACT WORK HOURS AND SAFETY STANDARDS ACT - OVERTIME COMPENSATION	JUL 2005	52.222-4
DAVIS-BACON ACT	JUL 2005	52.222-6
WITHHOLDING OF FUNDS	FEB 1988	52.222-7
PAYROLLS AND BASIC RECORDS	FEB 1988	52.222-8
APPRENTICES AND TRAINEES	JUL 2005	52.222-9
COMPLIANCE WITH COPELAND ACT REQUIREMENTS	FEB 1988	52.222-10
SUBCONTRACTS (LABOR STANDARDS)	JUL 2005	52.222-11
CONTRACT TERMINATION - DEBARMENT	FEB 1988	52.222-12
COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS	FEB 1988	52.222-13
DISPUTES CONCERNING LABOR STANDARDS	FEB 1988	52.222-14
CERTIFICATION OF ELIGIBILITY	FEB 1988	52.222-15
PROHIBITION OF SEGREGATED FACILITIES	FEB 1999	52.222-21
PREVIOUS CONTRACTS AND COMPLIANCE REPORTS	FEB 1999	52.222.22
EQUAL OPPORTUNITY	APR 2002	52.222-26
AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION	FEB 1999	52.222-27
DAVIS-BACON ACT - PRICE ADJUSTMENT (PERCENTAGE METHOD)	DEC 2001	52.222-31
EQUAL OPPORTUNITY FOR SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA AND OTHER ELIGIBLE VETERANS	DEC 2001	52.222-35
AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES	JUN 1998	52.222-36
EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS, VETERANS ON THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS	DEC 2001	52.222.37
COMPLIANCE WITH VETERANS' EMPLOYMENT REPORTING REQUIREMENTS	DEC 2001	52.222-38

DRUG-FREE WORKPLACE	MAY 2001	52.223-6
PATENT INDEMNITY- CONSTRUCTION CONTRACTS	APR 1984	52.227-4
ADDITIONAL BOND SECURITY	OCT 1997	52.228-2
IRREVOCABLE LETTER OF CREDIT	DEC 1999	52.228-14
FEDERAL, STATE AND LOCAL TAXES	APR 2003	52.229-3
ASSIGNMENT OF CLAIMS	JAN 1986	52.232-23
DIFFERING SITE CONDITIONS	APR 1984	52.236-2
SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK	APR 1984	52.236-3
SUPERINTENDENCE BY THE CONTRACTOR	APR 1984	52.236-6
PERMITS AND RESPONSIBILITIES	NOV 1991	52.236-7
OTHER CONTRACTS	APR 1984	52.236-8
USE AND POSSESSION PRIOR TO COMPLETION	APR 1984	52.236-11
ACCIDENT PREVENTION	NOV 1991	52.236-13
PRE-CONSTRUCTION CONFERENCE	FEB 1995	52.236-26
BANKRUPTCY	JUL 1995	52.242.13
GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS)	MAY 2004	52.245-2
INSPECTION OF CONSTRUCTION	AUG 1996	52.246-12
WARRANTY OF CONSTRUCTION	MAR 1994	52.246-21
VALUE ENGINEERING - CONSTRUCTION	FEB 2000	52.248-3
ALTERNATE I	APR 1984	
TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE)	MAY 2004	52.249-2
ALTERNATE I	SEP 1996	
DEFAULT (FIXED-PRICE CONSTRUCTION)	APR 1984	52.249-10

(End of clause)

END OF GENERAL CONDITION

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SUPPLEMENTARY CONDITIONS

1 GENERAL REQUIREMENTS

1.1 This contract provides the Government a means to contract for repair, renovation, alteration for buildings under the jurisdiction of the Architect of the Capitol, (AOC). It also provides a means for expedited procurement and should maximize the use of commercial requirement definitions and commercial practices of construction.

1.2 The Contractor shall provide all labor, supervision, tools, material, equipment, transportation, and management necessary to provide repair, renovation, and alteration to AOC Facilities.

2 CONTRACT MANAGEMENT

2.1 The Contractor shall implement contract management systems, which include all management functions involved in supporting, monitoring, and controlling project operations.

2.2 The Contractor shall implement necessary work control procedures to ensure quality and timely work completion and tracking of work progress. The Contractor shall plan and schedule work to assure material, labor, and equipment are available to complete work within the specified time limits and in conformance with the quality standards specified. The contractor shall;

(1) Manage the total work effort associated with the alteration, and repair to ensure responsive and cost-effective performance of these services. Such management includes, but is not limited to, planning, scheduling, safety, and quality control. Provide an adequate staff of personnel with the necessary management expertise to assure timely performance of the required work.
(2) Develop, evaluate, and refine submittals, plans, specifications, and schedules, as specified in delivery orders, for approval by the Contracting Officer, (CO).
(3) Provide administrative and technical support for all work.

3. GENERAL PERFORMANCE REQUIREMENTS

3.1 The contractor shall employ industry-approved Best Management Practice performance standards and methods, qualified personnel and quality materials, in order to obtain the highest practical efficiency as a balance of quality, reliability, responsiveness, safety and cost-effectiveness. As a minimum, the contractor shall perform work in conformance with codified industry standards, such as the International Building Codes, National Electric Code, and National Fire Code. The work performed shall conform to Uniform Facility Guide Specifications (UFGS). These guidelines and industry codes will generally form the minimum acceptable performance standard. Task orders may specify additional code or quality requirements.

3.2 It is the responsibility of the Contractor to meet required completion dates. As such, whenever the same subcontractor is being utilized on more than one task order, the Contractor shall ensure that a realistic schedule for that subcontractor's work can be devised that will result in timely completion of all projects. Inability to effectively coordinate subcontractors between projects may result in an unsatisfactory performance evaluation.

3.3 The Contractor is responsible for providing and maintaining project schedules for each task order. At a minimum, current schedules shall be submitted at the following intervals: with the task order bid, with each monthly invoice, with every proposal response to contract modification Request for Proposal (RFPs), at any time the scope changes, and at any time the project completion date changes. For projects over $500,000 the Contracting Officer may require the Contractor to provide CPM schedules using Primavera Sure Track scheduling program. Bar charts, and or tracking with Microsoft Project will be acceptable for smaller projects.

4 ORDERING OF WORK

4.1 As the need exists for performance under the terms of this contract, the Contracting Officer shall notify the Contractor of a requirement.

4.2 Upon receipt of this notification, the Contractor shall respond to the needs of the Government within one working day by: (for example: Notice by the Government given by noon, day 1 shall require a response by noon the next working day. Notice by the Government by 5 PM on day 1 shall require a response by 5 PM the next working day.)

(1.) Visiting the proposed work site in the company of the Contracting Officer and/or; Contracting Officer Technical Representative, (COTR), and;

(2.) Establishing verbal and or written contact with the Contracting Officer, and/or COTR to further define the scope of the requirement.

4.3 Upon establishment of the scope of the individual requirement, the Contractor shall then prepare a proposal for accomplishment of the task, with the guidance from the CO/COTR.

4.4 **Task Order Statement of Work (SOW):** Whenever the government has work to be performed under this contract, the Contracting Officer with support from the COTR and contractor will jointly develop for the subcontractor a Statement of Work (SOW), or written direction establishing the scope of the individual requirement, and requesting from the contractor a complete proposal to perform the work. The format and detail of the government provided statement of work might range from a narrative scope of work containing a brief description of the project, to a detailed set of specifications and drawings. The statement of work will normally include (1) the nature and extent of the work to be performed, (2) the location of the job site, (3) the time period requirements of the work, (4) government furnished material/equipment if applicable, and (5) any technical specifications applicable to the project.

4.5 **Task Orders** will include the following information:

(1) Date of the Task Order,
(2) Contract Number and the Task Order number,
(3) Scope of work and price for the work, and completion date for the work,
(4) Accounting and appropriation data, or written confirmation of available funding,
(5) When appropriate the liquidated damages using the levels specified in the FAR clause 52.211-12 Liquidated Damages shown in the Supplementary Conditions,
(6) Pre-bid conferences,
(7) Specialized experience requirements
(8) Government furnished equipment,
(9) Special work restrictions,
(10) Any other pertinent data.

4.7 **Incidental Planning and Design:** In response to the task order, the contractor may be required to perform incidental planning and engineering, and design. Costs to perform these

requirements shall be included within the prime contractor's coefficient rate from the appropriate line item in the schedule. This effort may include such requirements as, but are not limited to the following;

(1) Discussions with the AOC JOC Team. These discussions may be required to:
a. Confirm or develop more precise requirements and details,
b. Coordinate timing of the work,
c. Coordinate any required phasing of the work, and/or
d. Determine the preferred method or material in conformance with AOC Design Standards

(2) Site visit/investigation with the AOC JOC Team. This may include:
a. Site layout, and/or
b. Determination of site characteristics.

(3) Product Research – Research of products and materials that can fulfill the project requirements,
(4) Development of necessary sketches, shop drawings, and specifications,

(5) Engineering calculations, reports or studies.

4.8 Reserved.

4.9 **Project Support:** The following items, if dictated by the task order, shall be negotiated on a project-by project basis as distinct line items;

(1) Architectural and Engineering (AE) design services,
(2) Professionally signed and sealed architectural/engineering drawings (not to be confused with Record (As-Built) drawings which are required for all task orders unless indicated otherwise),
(3) Delivery Order specific tests and test results, beyond those required by codes or laws, such as:
a. Concrete strength,
b. Pressure testing,
c. Die penetration testing,
d. Soil compaction
(4) Special environmental permits and plans if required.
(5) Lead, asbestos or other HAZMAT investigations.

4.10 **Contractor's Response:** Upon receipt of the statement of work, the contractor shall inspect the work site, review the Statement of Work SOW, and meet with the contracting officer/COTR to thoroughly discuss all conditions and details of the work. The Contractor may submit recommendations for deviations to the Government's statement of work that will provide better quality, maintainability, operation, and price to the Government.

(1.) The Contractor shall develop a joint scope based on discussions and findings from pre-proposal meeting with the Government. Joint scope shall be submitted to the Government for approval prior to Contractor solicitation of competitive bids. Government approval of joint scope does not alleviate Contractor from meeting requirements in original Government scope unless specifically agreed upon between the two parties.

(2.) The Contractor shall solicit a minimum of three independent, qualified, and complete bids from potential subcontractors. The determination of qualified subcontractors shall be the responsibility of the Contractor. In the event that the Contractor cannot provide the minimum three independent bids, the Contractor shall request and the Government may approve the use of less than three bids. Additional supporting information shall be required if the Contractor believes that only a single source can satisfactorily perform the work and sole source subcontracting is required.

(3.) If after receipt of the RFP, the Contractor believes that qualified subcontractors are not available or that use of subcontractors would adversely affect the performance of the specified work, the Contractor shall submit information supporting this assertion and request approval for the Contractor's company to bid the work directly.

5 CONTRACTOR'S PROPOSAL

5.1 **General:** Unless otherwise specified, the Contractor shall submit a proposal to the Contracting Officer within 10 calendar days after receipt of the SOW, or (2) determined by the Contracting Officer for urgent projects within 2 calendar days after receipt of the SOW by the Contractor. The Contractor shall make every effort to meet deadline for proposal submittal.

5.2 For projects that require design effort by the Contractor, the Contractor shall submit their proposal within 15 calendar days, or the time mutually agreed upon between the Government and the Contractor.

5.3 **Technical Basis Documentation:** In support of the technical basis for individual orders, the Contractor will generally provide;
(1) Joint scoring documentation,
(2) Sketches, shop drawings, and specifications, as required,
(3) Engineering calculations, as required,
(4) Material submittals, as required,
(5) Schedule for any long lead items,
(6) Schedule for the task order.

5.4 **Pricing Documentation:** In support of the pricing basis for individual orders, the Contractor shall provide;
(1) A minimum of at least three independent, qualified, and complete bids from potential subcontractors. This may require appropriate market research and soliciting several sources if only one or fewer sources provide bids from the Contractors solicited from the three or more Contractors solicited.
a. Bids shall be provided in a software format indicated below, or, in the absence of such direction, in a format that is acceptable to the Contracting Officer. Word processing shall use Microsoft Word 2003 or more current version, or WordPerfect Version 10 or higher. Spreadsheets shall use Microsoft Office Excel 2003 or more current version. Drawings shall use Micro station Version 7 or 8. Tracking of projects may require the use of Micro Project when required for small projects. Schedules for task orders over $500,000 will be prepared using either Primavera P3 or Primavera Sidetrack. The contractor shall establish and maintain electronic mail (e-mail) capability, and fax capability within 7 days after contract award.
b. Each of the three bids shall include a list of subcontractors that will be used to perform the work, if awarded.
(2) Rationale for selection of a subcontractor.

5.5 **Contracting Officer Acceptance of Task Order Proposal:** The Contracting Officer may accept the Contractor's proposal without further discussion or negotiate any item with which the Contracting Officer may not agree. Upon acceptance of the proposal or completion of negotiations, the Contracting Officer shall issue the task order at a lump sum price. The work ordered shall be Firm Fixed Price for performance of the desired work or repair with the application of the appropriate coefficient rate.

5.6 ADJUSTMENTS TO COEFFICIENTS FOR OPTION YEARS

Adjustment to the option year coefficients will be in accordance with the equation:
Cn = C X F

Where: Cn = New Coefficient
C = Coefficient of base or last Option Period of Contract
f = Index factor

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f = CCI/CCI(b)
Where: CCI = Construction Cost Index for previous month*
CCI(b) = Construction Cost Index at time of Award or of last option period.
* CCI and CCI(b) indices are obtained from the Engineering News-Record (ENR), the McGraw-Hill Construction Weekly. In computing f, the CCI is published the month prior to base award or option year award.

PART 2

AOC52.201-1 CONTRACTING OFFICER'S AUTHORITY (JUN 2004)

The Contracting Officer is the only person authorized to make or approve any changes in any of the requirements of this contract, notwithstanding any provision contained elsewhere in this contract. In the event that the Contractor makes any change at the direction of any person other than the Contracting Officer, the change will be considered to have been made without authority and no adjustment will be made in the contract price to cover any increase in costs incurred as a result thereof.

(End of clause)

AOC52.201-2 CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR) (MAR 2005)

The Government shall provide the name, address and telephone number of the COTR at the time of contract award and the duties thereby delegated to that person. Any subsequent change to the individual or the individual's responsibilities will be confirmed in writing by the Contracting Officer. In no instance will the COTR be delegated authority to order any change in the contractor's performance which would affect (a) cost or schedule for contracts for services or supplies, or (b) scope, the completion date for intermediate phases or milestones, or overall completion date for contracts for construction.

(End of clause)

FAR 52.211-12 LIQUIDATED DAMAGES (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of (See chart below) for each calendar day of delay until the work is completed or accepted.

Project Cost	**Liquidated Damages (Dollars Per Calendar Day)**
$50,000-$100,000	$140
$100,000-$500,000	$200
Each additional $100,000	add $50

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

©) If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted. The liquidated damages amount for any task order will not exceed the total amount of that task order.

(End of clause)

FAR 52.211-13 TIME EXTENSIONS (SEP 2000)

Time extensions for contract changes will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements related to the changed work and that the remaining contract completion dates for all other portions of the work will not be altered. The change order also may provide an equitable readjustment of liquidated damages under the new completion schedule.

(End of clause)

AOC52.211-1 KEY PERSONNEL (MAR 2005)

(a) The Contractor shall assign to this contract the following key personnel: (the name(s) of the key personnel shall be completed at time of award)

Name	Title	Telephone No.

(b) During the first ninety (90) days of performance, the Contractor shall make no substitutions of key personnel unless the substitution is necessitated by illness, death, or termination of employment. The Contractor shall notify the Contracting Officer within 15 calendar days after the occurrence of any of these events and provide the information required by Paragraph ©) below. After the initial 90-day period, the Contractor shall submit the information required by Paragraph ©) to the Contracting Officer at least 15 calendar days prior to making any permanent substitutions.

©) The Contractor shall provide a detailed explanation of the circumstances necessitating the proposed substitutions, complete resumes for the proposed substitutions, and any additional information requested by the Contracting Officer. Proposed substitutes should have comparable

qualifications to those of the person being replaced. The Contracting Officer will notify the Contractor within 15 calendar days after receipt of all required information of the decision on substitutions. The contract will be modified to reflect any approved changes of key personnel.

(d) The approval of substitute personnel will not be considered to be grounds for an increase in the contract price.

(e) The special security requirements in AOC52.223-5, Special Security Requirements - Services, or AOC52.223-6, Special Security Requirements - U.S. Supreme Court, shall apply to all approved Contractor personnel substitutions.

(End of clause)

AOC52.211-5 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK (SEP 2004)

(a) All work to be performed under this contract shall be completed within (To be filled in for each Task Order) calendar days after the date of contract award. No work under this contract shall be performed on Saturdays, Sundays or Federal holidays and, for work performed in the District of Columbia, Presidential Inauguration Day, except with prior approval of the Contracting Officer.

(b) Time for completion of the contract work will be adjusted only in accordance with applicable clauses in the GENERAL CONDITIONS (e.g., "Differing Site Conditions", "Changes", “Changes - Supplement”, "Suspension of Work").

(End of clause)

AOC52.222-2 SUPPLEMENTAL WAGE DETERMINATION/RATE REQUEST (SEP 2004)

(a) The wage determination or rate, hereby incorporated, does not include the classification, (To be determined). The Contracting Officer submitted a request for a wage determination or rate to the U.S. Department of Labor, for a decision pertinent to the wage determination or rate applicable to the class of employee utilized in the work herein specified. As of the date of issue of this solicitation, such wage determination or rate has not been received by the Contracting Officer. Upon receipt, a copy of the Department of Labor’s action will be forwarded to the contractor by the Contracting Officer.

(b) In the event that a wage determination or rate is not forthcoming from the Department of Labor prior to the opening of offers, each offeror agrees, by signing and submitting its offer, to be bound to compliance with the pertinent wage determination or rate of the Department of Labor, as eventually promulgated.

©) If the action from Department of Labor results in a modification that is an increase to the wage and fringe benefit payments but shall not otherwise include any amount for general and administrative costs, overhead, or profit. The contractor also warrants that the price in this contract does not include any allowance for contingency to cover increased costs for which the adjustment is provided under a modification. In addition, the contractor shall provide, upon request, to the Contracting Officer the originals of any documentation the contractor used when preparing the proposal which will be utilized by the Contracting Officer to ensure that the payment of the adjustment will be for only those hours indicated under the specified category.

(End of clause)

AOC52.223-5 SPECIAL SECURITY REQUIREMENTS - SERVICES (MAR 2006)

(a) All vehicles, and contents, used by the Contractor or his subcontractors, which enter or leave United States Government property during performance of the work, will be subject to clearance, inspection and identification procedures conducted by the United States Capitol Police. See the attachment entitled "U.S. CAPITOL POLICE NOTICE" for instructions prior to delivery.

(b) All persons entering the Legislative Branch Buildings shall gain access to the building by passing through x-ray screening devices. In addition, all handbags and all hand-carried items shall be screened by x-ray devices prior to their entry into the building.

©) All personnel provided by the Contractor and employed on the site of the work will be subject to a security background investigation. Each employee will be required to fill out an I.D. Request Form and U.S. Capitol Police Request for check of Criminal History Records and each employee will be photographed and fingerprinted. The Contractor shall provide any assistance required by any of its employees in completing the forms.

(d) Prior to commencement of work, the contractor and all designated on-site employees will be required, on a one-time basis, to be fingerprinted in Washington D.C. The location for the Electronic Fingerprinting Service is the U.S. Capitol Hill Police, Fairchild Building, 499 South Capitol Street SW, Washington, DC 20003.

(e) Within seven (7) calendar days after the date of contract award, the Contractor shall submit to the Contracting Officer's Technical Representative (COTR) a list of all employees proposed to be employed on this contract. This list shall include the employee's full name, date of birth and social security number.

(f) While security background investigations are in process, the Contractor's employees must not be granted access to the Capitol Hill complex to perform work or provide services for the AOC unless they are escorted by an AOC staff member. "Escorted" is defined to mean that the AOC staff member will remain with the employee(s) **at all times** during the performance of the work. Any of the Contractor's employees who are perceived by the Contracting Officer as a security risk as a result of evidence discovered in the background security investigation, will not be issued an Identification Card, will be denied access to the site of the work, and the Contractor will be directed to remove such employee from performance of any of the contract work, whether it be on or off the work site. Any contractor employee denied access to the site of work on a contract or task/delivery order as a result of a security investigation may not apply for access to any other AOC/U.S. Supreme Court contract or task/delivery order work site.

(g) An identification card, with photograph, will be prepared for each employee of the Contractor requiring access to the site. The identification card shall be dated to indicate the period of time for which it is to remain valid - from the date the employee reports for duty until the applicable date which occurs first: the expiration of the contract, or the last date of the employee's tour of duty with the Contractor. All contractor personnel must wear the ID badge whenever on the Capitol complex premises or when attending off-site functions on behalf of the AOC. ID badges must be worn in such a manner that contractor personnel can be easily identified as such.

(h) All persons entering the Legislative Branch Buildings shall gain access to the building by passing through a magnetometer. In addition, all handbags and all hand-carried items shall be screened by x-ray devices prior to their entry into the building.

(I) The Contractor is fully responsible to return:

(1) The ID badge of any individual employee, including subcontractor personnel, who is removed for any reason including but not limited to illness, or dismissal;

(2) The ID badges of all contractor employees, including subcontractor personnel, whose performance under the contract is completed in advance of final contract job completion; and

(3) All outstanding ID badges issued for the contractor and its employees, including subcontractor personnel, within 24 hours of on site contract job completion.

(j) ID badges are to be hand delivered by the contractor within 24 hours of any of the events listed under (f) above to the Contracting Officer's Representative.

(End of clause)

AOC52.223-6 SPECIAL SECURITY REQUIREMENTS - U.S. SUPREME COURT
(AUG 2005)

(a) All contractor personnel including both prime contractor and subcontractor personnel ("contractor personnel") performing work for or at the Supreme Court under this contract will be subject to a security investigation.

(b) The contractor will provide the Supreme Court Police the full name, social security number, place of birth, and date of birth for all contractor personnel performing work for or at the Supreme Court, in a single package within one week of contract award. All security investigation requests will be identified with the AOC contract number under which the work will be performed.

©) Contractor personnel will not be permitted access to the Supreme Court job site until a completion of a favorable Supreme Court Police security investigation. Upon completion of a favorable security investigation contractor personnel will be issued a Supreme Court contractor identification card. The contractor identification card shall be returned immediately to the Supreme Court Police upon completion of work on site by the individual, the contractor's completion of all work on site under the contract, the expiration date of the contractor identification card, or on demand by the Supreme Court Police. Any contractor employee denied access to the site of work on a contract or task/delivery order as a result of a security investigation may not apply for access to any other AOC/U.S. Supreme Court contract or task/delivery order work site.

(d) Any of the contractor's personnel who are perceived by the Contracting Officer or the Marshall's Office of the Supreme Court as a security risk, as a result of evidence discovered during the security investigation, will not be issued a Supreme Court contractor identification card and will be denied access to the job site. The contractor is required and will be directed by the Contracting Officer to remove such person from performance of any of the contract work, whether it be on of off the work site. Any contractor personnel perceived as a security risk after being issued a contractor identification card, may be ordered to return the identification card immediately to the Supreme Court police and may be denied access to the job site.

(e) In addition to the security investigation and contractor identification requirements identified above, all contractor personnel permitted on site at the Supreme Court must be escorted by AOC personnel assigned to work at the Supreme Court under the Superintendent, Facilities Manager Office. Contractor personnel found within the Supreme Court premises without an escort will be removed from the site. All contractor personnel must wear the ID badge whenever on the Capitol complex premises or when attending off-site functions on behalf of the AOC. ID badges must be worn in such a manner that contractor personnel can be easily identified as such.

(f) All vehicles and contents used by the contractor and/or the Contractor's subcontractors or suppliers which enter or leave Supreme Court property during the performance of the work, will be subject to inspection, identification and clearance procedures. The contractor will notify and provide a bill of lading to the Supreme Court Police 24 hours in advance of any vehicles arriving at the job site. Vehicles are to report to the Supreme Court Police at the Second and East Capitol Street entrance, or as otherwise instructed, for inspection. In addition to the inspection of the vehicle and its contents, all drivers and helpers will be required to pass through a Magnetometer. All persons possessing weapons or contraband will be subject to arrest and prosecution.

(g) The Contractor is fully responsible to return:

(1) The ID badge of any individual employee, including subcontractor personnel, who is removed for any reason including but not limited to illness, or dismissal;

(2) The ID badges of all contractor employees, including subcontractor personnel, whose performance under the contract is completed in advance of final contract job completion; and

(3) All outstanding ID badges issued for the contractor and its employees, including subcontractor personnel, within 24 hours of on site contract job completion.

(h) ID badges are to be hand delivered by the contractor within 24 hours of any of the events listed under (g) above to the Contracting Officer's Technical Representative (COTR).

(End of clause)

AOC52.223-8 DELIVERY VEHICLE INSPECTION REQUIREMENTS (MAR 2006)

(a) All vehicles and contents used by the Contractor or his subcontractors which enter or leave United States Government property during performance of work under this contract will be subject to clearance, inspection, and identification procedures conducted by the United States Capitol Police.

(b) *Mobile Vehicle and Cargo Inspection System (Mobile VACIS).* All delivery vehicles carrying fuel, garbage, or similar cargo that cannot be offloaded for inspection and security screening shall utilize the Mobile VACIS located at Third and Pennsylvania Avenue, NW, Washington, DC, for inspection prior to making deliveries to any building within the Capitol Complex, including, but not limited to, the U.S. Capitol Building; the U.S. Botanic Garden; the Hart, Dirksen, and Russell Senate Office Buildings; the Rayburn, Longworth, Cannon, and Ford House Office Buildings; the Thomas Jefferson, John Adams, and James Madison Memorial Library of Congress buildings; the Capitol Power Plant; the Capitol Visitors Center; and the U.S. Supreme Court and Thurgood Marshall Federal Judiciary Buildings.

(1) For deliveries requiring Mobile VACIS inspection, within seven calendar days or prior to the first delivery, the contractor shall provide the following information to the U.S. Capitol Police:

(I) List of drivers;

(ii) Date of birth for each driver;

(iii) Social Security Number of each driver;

(iv) Vehicle make;

(v) Vehicle model;

(vi) License tag number and state where vehicle is licensed;

(vii) Color of vehicle; and

(viii) Contractor name, if shown on the vehicle.

(2) Information for deliveries made through the Mobile VACIS unit must be faxed to (202) 228-4313. For verification of receipt, the contractor may call (202) 224-9728.

(3) Updates to the above information for Mobile VACIS deliveries must be sent to the U.S. Capitol Police throughout the period of performance of the contract.

©) *4700 Shepherd Parkway SW inspection facility*. All other vehicles making deliveries to the above listed locations except for the Thomas Jefferson, John Adams, and James Madison Memorial Library of Congress buildings and the U.S. Supreme Court shall utilize the off-site inspection and screening facilities at 4700 Shepherd Parkway SW, Washington DC 20032.

(End of clause)

AOC52.236-11 SUBMITTALS (JUN 2004)

(a) The Contractor shall deliver all required submittals within the times specified elsewhere in this contract. Unless specifically stated otherwise, two (2) sets of each item shall be delivered by the contractor to the Contracting Officer's Technical Representative. An in-depth description of these submittals can be found in the appropriate technical sections of the specification. Any Schedule of Work prepared shall reflect delivery of these items. Failure to provide timely delivery of these submittals may be considered to be grounds for termination for default.

(b) The Government will review the submittals and either approve them as submitted, or mark required changes on them. If changes are required, the Contractor shall deliver revised submittals for approval by the Government which incorporate all of the required changes within two weeks after receipt by the Contractor of the marked-up submittals.

(End of clause)

END OF SUPPLEMENTARY CONDITIONS

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REPRESENTATIONS, CERTIFICATIONS,
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FAR 52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

(a) The offeror certifies that -

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to –

(i) Those prices;

(ii) The intention to submit an offer; or

(iii) The methods or factors used to calculate the prices offered;

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory -

(1) Is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this provision; or

(2)(i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this provision

_____

[*insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or per position in the offeror's organization*];

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) of this provision have not participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this provision; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this provision.

(c) If the offeror deletes or modifies paragraph (a)(2) of this provision, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

(End of provision)

FAR 52.204-3 TAXPAYER IDENTIFICATION (OCT 1998)

(a) *Definitions*. "Common parent," as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.
"Taxpayer Identification Number (TIN)," as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) *Taxpayer Identification Number (TIN)*.

_____ TIN: _____.

_____ TIN has been applied for.

_____ TIN is not required because:

_____ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

_____ Offeror is an agency or instrumentality of a foreign government;

_____ Offeror is an agency or instrumentality of a Federal government;

(e) *Type of organization*.

_____ Sole proprietorship;

_____ Partnership;

_____ Corporate entity (not tax-exempt);

_____ Corporate entity (tax-exempt);

_____ Government entity (Federal, State, or local);

_____ Foreign government

_____ International organization per 26 CFR 1.6049-4;

_____ Other _____

(f) *Common Parent.*

_____ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

_____ Name and TIN of common parent:

Name _____

TIN _____

(End of provision)

AOC52.204-2 DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (JUN 2004)

(a) The offeror shall enter, in the space provided below, the DUNS number that identifies the offeror's name and address exactly as stated in the offer. The DUNS number is a nine-digit number assigned by Dun and Bradstreet Information Services.

(b) If the offeror does not have a DUNS number, it should contract Dun and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror, if located within the United States, should call Dun and Bradstreet at 1-800-333-0505. The offeror should be prepared to provide the following information:

(1) Company name,

(2) Company address;

(3) Company telephone number;

(4) Line of business;

(5) Chief executive officer/key manager;

(6) Date the company was started;

(7) Number of people employed by the company; and

(8) Company affiliation.

(c) Offerors located outside the United States may obtain the location and phone number of the local Dun and Bradstreet Information Services office from the Internet home page at http://www.customerservice@dnb.com. If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at globalinfo@mail.dnb.com.

(d) Enter DUNS number:_____.

(End of provision)

AOC52.204-3 REPRESENTATIONS AND CERTIFICATIONS (NOV 2004)

The offeror shall properly execute and submit with its offer the Representations and Certifications contained herein. Insert information in spaces provided as applicable.

(End of provision)

FAR 52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that–

(i) The offeror and/or any of its Principals –

(A) Are ( ) are not ( ) presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have ( ) have not ( ), within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are ( ) are not ( ) presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) The Offeror has ( ) has not ( ), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plan manager; head of a subsidiary, division, or business segment, and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(c) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(d) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of

the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(e) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(f) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

AOC52.215-8 AUTHORIZED NEGOTIATORS (JUN 2004)

The offeror represents that following persons are authorized to negotiate on its behalf with the Government in connection with this Request for Proposal and any subsequent Task Orders (changes to this list must be submitted in writing and certified by an officer of the corporation:

_____ _____

Name Title

Telephone: _____ E-Mail:_____

_____ _____

Name **Title**

Telephone: _____ **E-Mail:**_____

_____ _____

Name **Title**

Telephone: _____ **E-Mail:**_____

(End of provision)

END OF REPRESENTATIONS, CERTIFICATIONS, AND OTHER STATEMENTS OF OFFERORS

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SOLICITATION CONDITIONS

FAR 52.211-6 BRAND NAME OR EQUAL (AUG 1999)

(a) If an item in this solicitation is identified as "brand name or equal," the purchase description reflects the characteristics and level of quality that will satisfy the Government's needs. The salient physical, functional, or performance characteristics that "equal" products must meet are specified in the solicitation.

(b) To be considered for award, offers of "equal" products, including "equal" products of the brand name manufacturer, must–

(1) Meet the salient physical, functional, or performance characteristic specified in this solicitation;

(2) Clearly identify the item by–

(I) Brand name, if any; and

(ii) Make or model number;

(3) Include descriptive literature such as illustrations, drawings, or a clear reference to previously furnished descriptive data or information available to the Contracting Officer; and

(4) Clearly describe any modifications the offeror plans to make in a product to make it conform to the solicitation requirements. Mark any descriptive material to clearly show the modifications.

©) The Contracting Officer will evaluate "equal" products on the basis of information furnished by the offeror or identified in the offer and reasonable available to the Contracting Officer. The Contracting Officer is not responsible for locating or obtaining any information not identified in the offer.

(d) Unless the offeror clearly indicates in its offer that the product being offered is an "equal" product, the offeror shall provide the brand name product referenced in the solicitation.

(End of provision)

AOC52.215-1 INSTRUCTIONS TO OFFERORS (FEB 2005)

(a) *Definitions.* As used in this provision --
"Proposal modification" is a change made to a proposal before the solicitation's closing date and time, or made in response to an amendment, or made to correct a mistake at any time before award.
"Proposal revision" is a change to a proposal made after the solicitation closing date, at the request of or as allowed by a Contracting Officer as the result of negotiations.
"Time," if stated as a number of days, is calculated using calendar days, unless otherwise specified, and will include Saturdays, Sundays, and legal holidays, including Presidential Inauguration Day. However, if the last day falls on a Saturday, Sunday, or legal holiday, including Presidential Inauguration Day, then the period shall include the next working day.

(b) Offerors are expected to examine the entire solicitation and all instructions. Failure to do so will be at the offeror's risk. Each offeror shall furnish the information required by the solicitation. The offeror will be held responsible for full knowledge of all information contained therein.

©) *Packaging, transmission, and tracking of proposals.* (1) Proposals, modifications, and revisions shall be enclosed, in the quantities specified elsewhere in this solicitation, in sealed envelopes. Address envelopes to: Architect of the Capitol, Procurement Division, Ford House Office Building, Attn: John Friedhoff, Room H2-263 Bid Room, Second and "D" Streets, S.W., Washington, DC 20515. Offeror shall write "Bid Documents Enclosed", "H2-263 Bid Room", and write the solicitation number, time and date for receipt of offers on the exterior of the package on the same side as the address. Telegraphic or facsimile proposals and modifications will not be considered.

(2) Current security requirements established by the U.S. Capitol Police to screen mail being delivered to the U.S. Capitol Complex of buildings preclude the use of U. S. Postal Service by offerors to deliver their proposals submitted in response to this solicitation. In addition, because all packages must be screened for security purposes at a central location prior to their delivery, the Architect of the Capitol cannot accept packages containing offers hand carried directly to the Bid Room address within the Ford House Office Building, or any other location in the U.S. Capitol Complex of buildings. **See "Notice for Delivery" on the front of the solicitation**.

(3) To assist in tracking of proposals, offerors are requested to fax a copy of their signed "Solicitation, Offer and Award" form as well as a copy of the FEDEX or UPS receipt to (John Friedhoff) to (202) 225-3221 at the time of the issuance of their proposal.

(4) The only acceptable method by which offerors can deliver their responses to this solicitation shall be via Federal Express (FEDEX) or United Parcel Service (UPS). Offers

submitted via any other method will be rejected. **OFFERORS - DO NOT MAIL YOUR OFFER BY REGULAR U.S. MAIL.** See notice attached to this solicitation for special instructions.

(d) *Submission, modification, revision, and withdrawal of proposals*. (1) Offerors are responsible for submitting proposals and any modifications or revisions so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m. local time, for the designated Government office on the date that the proposal or revision is due. For the purposes of determining timeliness, the designated Government office is defined as the Pitney Bowes Management Services Capitol Heights Mail Facility at 9140 East Hampton Drive, Capitol Heights, Maryland 20743.

(2) Any proposal, modification, or revision received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would no unduly delay the acquisition, and-

(I) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals;

(ii) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of proposals and was under the Government's control prior to the time set for receipt of proposals; or

(iii) It is the only proposal received.

(3) However, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(4) Acceptable evidence to establish the date of receipt at the Government installation includes the time/date stamp of that installation on the offer wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(5) If an emergency or unanticipated event interrupts normal Government processes so that offers cannot be received at the Government office designated for receipt of proposals by the exact time specified in the solicitation and urgent Government requirements preclude amendment of the solicitation, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(6) Proposals may be withdrawn by written notice received at any time before award. Proposals may be withdrawn in person by an offeror or an authorized representative if the identity of the person requesting withdrawal is established and the person signs a receipt for the proposal before award.

(End of provision)

AOC52.215-2 INTERPRETATIONS AND AMENDMENTS (JUN 2004)

(a) Any prospective offeror desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing no later than fourteen calendar days prior to the date established for receipt of offers. Oral explanations or instructions given before the award of a contract will not be binding.

(b) Prospective offerors shall request the Contracting Officer, in writing, via FAX or e-mail for an interpretation or correction of any ambiguity, inconsistency, or error in the contract documents which they may discover or which should have been discovered by a reasonably prudent offeror. Such requests or objections to materials or methods of construction shown or specified shall be directed to the attention of the Contracting Officer at least ten (10) calendar days prior to the date specified for receipt of proposals. Written requests shall be transmitted via e-mail to jfriedho@aoc.gov or via facsimile to (202) 225-3221.

(c) Any interpretations or corrections, as well as any additional modifications the Contracting Officer may desire to include, will be in the form of amendments, in writing, which will be sent on the same date to all offerors if that information is necessary in submitting offers or if the lack of it would be prejudicial to other prospective offerors and shall become a part of any subsequent contract. The Contracting Officer reserves the right to answer only such questions as have, in his opinion, a definite bearing upon the proposals to be submitted.

(1) Offerors shall acknowledge the receipt of all amendments to the solicitation by:

(I) Signing and returning the amendment;

(ii) Identifying the amendment number and date in the space provided for this purpose on the form for submitting a offer;

(iii) Letter or telegram; or

(iv) Facsimile, if facsimile offers are authorized in the solicitation.

(2) The Government must receive the acknowledgment by the time and at the place specified for receipt of offers.

(d) Requests for oral interpretations or any other interpretations not made by amendments will not be accepted, and any information that may possibly be gained by offerors in that manner is gratuitous and not binding.

(e) If this solicitation is amended, all terms and conditions that are not amended remain unchanged.

(End of provision)

AOC52.215-3 RESTRICTION ON DISCLOSURE AND USE OF DATA (JUN 2004)

Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall–

(a) Mark the title page with the following legend:
"This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed--in whole or in part--for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of--or in connection with--the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction.

(b) Mark each sheet of data it wishes to restrict with the following legend:
"Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal."

(End of provision)

INSTRUCTIONS FOR PREPARING THE TECHNICAL PROPOSAL - SOURCE SELECTION PROCEDURES - CONSTRUCTION

(a) The Technical Proposal shall be organized in accordance with the following format to facilitate evaluation by the Government. The Technical Proposal shall be subdivided into four subsections: Specialized Experience, Management Approach, Scheduling Methodology and Past Performance; indexed by evaluation factor and contained in 8 ½" x 11" three ring binders, binder clips, rings, or other methods that allow the material to be viewed and removed easily. Spiral binding is strongly discouraged.
(b) Evaluation factors.

(1) ***Evaluation Factor 1 - Specialized Experience*** - **Multi-Project/Multi-Discipline Repair, Renovation, and Alteration Management Experience within the last five (5) years.** The offeror shall present the following data for themselves and for any proposed division, subcontractor or teaming contractor whose effort on this contract will significantly influence work performance.

(i) Address all relevant contracts held within the last five (5) years. Provide descriptions of current or recently completed contracts performed by the offeror, and any proposed major subcontractors (if any), from within the past five (5) years, which shall include descriptions of successfully managed contracts for at least three (3) comparable projects performed within the past five (5) years. Contracts may be either commercial or Government and should have been for the management of multi-project/multi-discipline construction efforts that should include work similar, however, not strictly limited to the work shown in the examples of work listed in part (ii) below. **Each project description shall include at a minimum the following**:

(A) Contract Number
(B) Contract award amount and final amount and description of any differences between the award amount and the final amount
(C) Procuring Agency/entity or contractor, and address
(D) Title of Contract, and location
(E) Name, address & current telephone & fax numbers* & E-mail address* of contract administrator or contracting officer at Agency/owner
*(fax & e-mail are optional)
(F) Brief description of Project (including discussion as to its relevancy to this acquisition)
(G) Period of Performance, with date of award and completion date
(H) Type of Contract
(I) Key personnel/subcontractors involved

(ii) The following list is provided as being representative of the type of work which may be included as part of this contract:

General tenant fit out: removal of existing drywall partitions and associated mechanical/electrical/audio communications; installation of new partitions and new associated mechanical/electrical/audio communications; new doors, frames & hardware, new drywall or acoustic ceilings.

Toilet room upgrades: complete renovations for ADA compliance, including new tile/marble, new mechanical/plumbing and electrical service, new toilet fixtures and accessories

General painting of existing offices.

System installations: installation of new, extension or replacement of existing mechanical, electrical, fire alarm systems. Including installation of pathways for systems to be installed by others.

Project support: provide trade support for projects being executed by the AOC Jurisdictions or Construction Division.

Concrete work; repair/patching of garage floor slabs; minor sidewalk repair.

(2) ***Evaluation Factor 2 - Management Approach***.

(i) ***Subfactor 1 - Organization:*** Provide an organization chart that demonstrates your ability to manage multiple projects at the same time without significant difficulty. Discuss your organization and as a minimum indicate the number of personnel and discuss the duties of proposed technical staff. Offerors should specify criteria (skill levels, include lines of accountability) for personnel in these positions. Describe functions, responsibilities and authorities for performing such duties as overall project management, site superintendence, quality control, estimating, scheduling and subcontract purchasing and administration. In addition, clearly define support and interface with home office or corporate headquarters for such aspects as financial, management and technical support, if applicable. Describe how your firm will be capable of responding to Government requirements and emergency response requirements specified in contract.

(ii) ***Subfactor 2 - Key Personnel:*** Provide resumes for proposed key personnel in the areas of project management, site superintendence and safety. Resumes shall include the proposed key personnel's background, education and experience. Personnel shall meet experience qualifications included in the special contract requirements or specifications, as applicable. Provide a list of major subcontractors who will be utilized throughout the life of the contract and the length of time and past relationship you have with subcontractors. Provide resumes for key personnel of proposed major subcontractors. Provide letters of intent for personnel not currently on staff, who are being hired for this effort and major subcontractors.

(iii) ***Subfactor 3 - Subcontractor Management Capability:*** Describe, in detail, your firm's subcontractor selection and management process. Provide criteria used in awarding subcontracts. Describe your firm's subcontractor management structure and the level of corporate oversight. Discuss processes which will be used to ensure consistent satisfactory performance of subcontractors. Describe your firm's on-site subcontractor management capability with respect to work schedules, change order requests, and quality of work. Describe the measures used by your firm to prevent labor violations and what actions are taken to resolve violations of the Davis Bacon Act.

(iv) ***Subfactor 4 - Quality Control & Safety:*** Provide your company Quality Control (QC) program consisting of your QC organization, plan, recurring meetings, construction operations on-site and off-site, and submittal review. The QC Program should also consist of the testing and documentation necessary to provide materials, equipment, workmanship, fabrication, construction, and operations that comply with this contract. In addition, please provide a broad discussion of all aspects of quality control to include, but not limited to, responsibility for surveillance of work, acceptance, rejection, documentation, and resolution of deficiencies, trend analysis and corrective action, quality control processes, and interface with Government inspectors.

Provide an executive summary of your company's safety program. The summary should include a general discussion of your accident prevention program including employee training and implementation of OSHA safety requirements. Provide a detailed summary of how your organization ties environmental compliance into its operations. Indicate what training is provided and what protections are implemented to ensure protection of our environment to include sediment and erosion control, asbestos, lead abatement, hazardous waste management, protection of natural resources, and general environmental stewardship. Describe steps that promoted safety during

construction within last three (3) years.

(3) ***Evaluation Factor 3 - Scheduling Methodology:*** Describe your scheduling technique and project planning methodology. Describe scheduling method(s) so as to develop a logical and realistic progress schedule. Identify automated scheduling systems you have or will use and/or intend to use on this contract. Describe your capabilities to schedule the complete project to ensure the work is completed within the contract duration.

(4) ***Evaluation Factor 4 - Past Performance:*** Although the Government reserves the right to use any source of information available on the Offeror's past performance to either evaluate past performance or verify information provided by the Offeror, the Offeror shall provide information that demonstrates the offeror's past performance. The enclosed "RELEVANT EXPERIENCE" and "PAST PERFORMANCE QUESTIONNAIRE" shall be provided to each of the companies/agencies submitted by the offeror in response to this solicitation. The questionnaire(s) must be faxed or e-mailed by the companies/agencies to the attention of John Friedhoff at (202) 225-3221 or (202) 226-7056, or e-mailed to JFRIEDHO@AOC.GOV by the date established for receipt of offers in order to be considered in the evaluation process. A neutral rating will be applied for those projects/contracts for which a questionnaire is not received.
(End of provision)

INSTRUCTIONS FOR PREPARING THE PRICE PROPOSAL - SOURCE SELECTION PROCEDURES - CONSTRUCTION (AOC)

(a) A fixed coefficient rate shall be entered by each offeror on the Schedule page for Line Items **001 - 004**; add and insert totals where indicated. The Architect reserves the right to request from each offeror information regarding the breakdown of all costs that are included in these prices and any task orders issued against this contract, to include copies of all work sheets used in forming the proposed pricing. Erasures or other changes on any or all submissions shall be initialed by the signer of the proposal or by his duly authorized agent.

(b) The Price Proposal shall be submitted with the following required documents in the order shown below:

(1) "SOLICITATION, OFFER, AND AWARD" form (original signature required in Block 20B);
(2) The "SCHEDULE" page;
(3) the "REPRESENTATIONS AND CERTIFICATIONS"; and
(4) the "BID GUARANTEE"

(End of provision)

EVALUATION CRITERIA - SOURCE SELECTION PROCEDURES - CONSTRUCTION (AOC)

General Requirements. The evaluation criteria to be used by the Contracting Officer for the selection of a

contractor to perform the work specified herein are defined below. The criteria are divided into Technical and Price categories. The Technical Evaluation Criteria, when combined, are significantly more important than price. However, as the difference in technical merit between the proposals becomes less significant, the relative importance of the proposed prices will increase.

(a) *Technical Evaluation Criteria.* The criteria to be used in assessing the quality of each proposal are listed below. The criteria are listed in descending order of importance with each subfactor listed in descending order of importance.

(1) ***Evaluation Factor 1 - Specialized Experience***

The Government will evaluate the quality and extent of related experience and determine if the offeror has experience managing and completing multi-construction projects that require multi-discipline repair, renovation, and alteration management skills to perform with an aggregate total of $5 million. Offerors possessing experience working with historical and/or large type buildings may receive a more favorable rating. **(Large building projects do no include single family homes and apartments up to and including 4 stories.)**

(2) ***Evaluation Factor 2 - Management Approach***

(i) ***Subfactor 1 - Organization***

The Government will evaluate the offeror's overall organization, organization chart, number of proposed personnel and the duties of the proposed technical staff to determine if the offeror has the ability to manage multiple projects without significant difficulties. The offeror's narrative must adequately address functions, responsibilities and authorities for performing such duties as overall project management, site superintendence, quality control and subcontract purchasing and administration. Specific criterion proposed (skill levels, experience and background) for personnel, if adequate, as an indicator of an acceptable organization. If applicable, the support and interface with home office or corporate headquarters for such aspects as financial, management and technical support were adequately defined. Narrative includes a reasonable description of how the offeror plans on complying with the contract's response requirements. Teaming/partnering arrangements between Management and Engineering, contractors and subcontractors and government staff are logical and effective.

(ii) ***Subfactor 2 - Key Personnel***

The Government will evaluate the offeror's proposed key personnel for the following functions; Project Management, site superintendence, and safety, as well as offeror's list of all major subcontractors who will be utilized throughout the life of the contract. A resume for each proposed key personnel to include background, education, and experience was provided and indicates acceptable experience. Key Personnel meet experience qualifications included in the special contract requirements.

(iii) ***Subfactor 3 - Subcontractor Management Capability***

The Government will evaluate the offeror's ability to successfully select and manage subcontractors. The proposed Subcontractors are verifiable, and narrative indicates a good professional relationship with multi-discipline subcontractors. Subcontractors possess previous experience, present capabilities and quality of previous jobs. Policies and procedures ensure effective management of subcontractors to ensure quality workmanship and timely completion.

(iv) ***Subfactor 4 - Quality Control & Safety***

The Government will evaluate the offeror's proposed quality control activities. The offeror's quality control discussion details the offeror's assignment controls that ensure engineer, superintendent, inspectors/quality control personnel possess the requisite skills, experience and training to review/inspect construction work assigned. Proposed construction quality control processes and methods are logical, effective and ensure only high quality materials and workmanship is accepted. The tools/methods to be used to identify and correct subcontractors and/or in-house personnel that are performing poorly or producing substandard work are clearly defined. Tools/method described are adequate, logical and reflect a sound management approach. As a minimum daily inspections and weekly updates are conducted.

The Government will evaluate the offeror's familiarity with and adherence to OSHA standards and standard District of Columbia OSHA safety requirements. Offeror's discussion included steps that promoted safety during construction within the last **three (3) years**. A reasonable explanation of how the contractor intends to maintain an accident free worksite.

(3) ***Evaluation Factor 3 - Scheduling Methodology***

The Government will evaluate the offeror's scheduling methodology to determine if scheduling processes ensure completion and control of the project from beginning to the end of the project. Contractor demonstrates an understanding of the scheduling requirements of the RFP and the limitations of a schedule. Contractor understands that an appropriate schedule will result in successful completion of projects. Contractor adequately describes capability to meet CPM format requirements when required.

(4) ***Evaluation Factor 4 - Past Performance***

The Government shall evaluate the business practices and quality of the offeror's past performance based upon performing work on **large buildings of historical significance**. The assessment of the offeror's past performance will be used as a means of evaluating the relative

capability of the offeror to the other competitors. **(Large building projects do not include single family homes and apartments up to and including 4 stories.**)

The Government will use references provided in response to Factor 1, and may use other references, to verify past performance.

Evaluation of past performance will be a subjective assessment based upon a consideration of all relevant facts and circumstances. The Government is seeking to determine whether the offeror has consistently demonstrated the following:

(i) Reasonable and cooperative relationships with Government Program and Contract Management offices to include responsiveness to technical direction and contract administration

(ii) Flexible, reasonable and cooperative in meeting mission changes/contract changes and an overall concern for Government's interest

(iii) Satisfaction of end users with the contractor's products and services, to include follow on responsiveness to warranty issues and product concerns.

(iv) Successful subcontractor relationships and subcontractor management

(v) A commitment to customer satisfaction, quality management and workmanship, specification compliance, safety and timely delivery/adherence to schedule of services at fair and reasonable prices.

(vi)

(vi) Record of successful compliance with established minimum standard operations; compliance with standards of good workmanship; ability to meet user's mission needs, including cost and schedule.

(vii) Successful record of work integration among subcontractors/teaming arrangements and other parties affected by the work and ability to solve multiple problems and to stay on schedule.

(viii) Quality supplies and work performed; compliance with contract requirements; ability to resolve problems with minimal Government intervention; accuracy of reports and test data; technical ability and conformance to good workmanship standards; and proven ability to identify, correct and prevent discrepancies.

(ix) Effective project management and workforce structure to perform the contract; track record of principal individuals selected to manage and perform key aspects of the contract, to include the past performance of the offeror as a whole and how well the offeror's employees have performed.

(x) Record of identifying and managing performance risks.

(xi) Successful implementation and transition to the end user with minimal disruption.

Offerors will be given an opportunity to address especially unfavorable reports of past performance, and the offeror's response, or lack thereof, will be taken into consideration. In investigating the offeror's past performance, the Government will consider references submitted by the offeror and may consider information from other sources.

The Government's conclusions about the overall quality of the offeror's past performance will be highly influential in determining the relative merits of the offeror's proposal and in selecting the offers considered most advantageous to the Government. Past performance findings will be used to validate proposals

against established evaluation criteria and assign an overall risk to the Government for successful performance.

The Government will consider the currency, relevancy and trends of the performance information while conducting its performance evaluation. For the purpose of this solicitation, currency is performance occurring within the last five (5) years through the solicitation release date. Within this period, performance occurring later in the period may have greater significance than work occurring earlier in the period. For example, performance information for work occurring during 2003 may have greater importance than performance information for work occurring during 1999. In assessing relevancy, the Government may evaluate an offeror's references for similarity of the construction methods provided, scope of contract and location of work. Relevancy will be evaluated based on successful performance in the construction.

An offeror with no past performance may receive a rating based on the evaluation of its predecessor companies, key personnel, and/or subcontractors. These ratings may/may not have the same weight as the ratings of the proposing company. If such information is not applicable (i.e., the offeror does not have a predecessor company, key personnel or subcontractors with relevant experience), the offeror shall be evaluated as "neutral". However, the proposal of an offeror with no relevant past/present performance history, while rated neutral in past/present performance, may not represent the most advantageous proposal to the Government and thus, may be an unsuccessful proposal when compared to the proposal of the other offerors.

(b) *Price Evaluation Criteria*. The Government will evaluate the price proposals of all firms found technically qualified. Price criterion measures not only actual dollars but also analyzes the reasonableness of the offeror's proposed price. For evaluation purposes only, the evaluated price will be the sum of the proposed prices for Items **001 thru 004**.

AOC52.215-5 CONTRACT AWARD - SOURCE SELECTION PROCEDURES (JUN 2004)

(a) The Government will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to the solicitation will be most advantageous to the Government, cost or price and other factors, specified elsewhere in this solicitation, considered.

(b) The Government may–

(1) Reject any or all offers if such action is in the public interest;

(2) Accept other than the lowest offer; and

(3) Waive informalities and minor irregularities in offers received.

(c) The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial

proposal should contain the offeror's best terms from a price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

(d) The Government may accept any item or combination of items, unless doing so is precluded by a restrictive limitation in the solicitation or the offer.

(e) A written award or acceptance of offer mailed or otherwise furnished to the successful offeror within the time for acceptance specified in the offer shall result in a binding contract without further action by either party. Before the offer's specified expiration time, the Government may accept an offer (or part of an offer as provided in Paragraph (d) of this provision), whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award. Negotiations conducted after receipt of an offer do not constitute a rejection or counteroffer by the Government.

(f) Neither financial data submitted with an offer, nor representations concerning facilities or financing, will form a part of the resulting contract. However, if the resulting contract contains a clause providing for price reduction for defective cost or pricing data, the contract price will be subject to reduction if cost or pricing data furnished is incomplete, inaccurate, or not current.

(g) The Government may determine that an offer is unacceptable if the prices proposed are materially unbalanced between line items or sub line items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated as indicated by the application of cost or price analysis techniques. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.

(End of provision)

AOC52.215-7 PREPARATION OF PROPOSALS - CONSTRUCTION (JUN 2004)

(a) Offers shall be submitted, in the quantities as stated elsewhere in this solicitation, on the accompanying printed form entitled, "SOLICITATION, OFFER, AND AWARD (Repair, Renovation, and Alteration Services)" and copies thereof, with blank spaces suitably filled in. Erasures or other changes on any or all submissions shall be initialed by the signer of the offer.

(b) Copies of the offer shall be identical and each copy shall give the full business address of the offeror, and be signed by him (see Block 20B of the form entitled, "SOLICITATION,

OFFER, AND AWARD (Construction, Alteration, or Repair") with his usual signature. Offer by partnerships shall furnish the full names of all partners, and shall be signed with the partnership name by one of the members of the partnership or by an authorized representative, followed by the signature and designation of the person signing. Offers by corporations shall be signed with the legal name of the corporation, followed by the name of the State of incorporation and by the signature and designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person signing shall be typed or printed below the signature. An offer by a person who affixes to his signature the word "president", "Secretary", "agent", or other designation, without disclosing his principal, may be held to be the offer of the individual signing. When requested by the Government, satisfactory evidence of the authority of the offer signing in behalf of the corporation shall be furnished.

(End of provision)

AOC52.215-9 FAILURE TO SUBMIT OFFER (JUN 2004)

Recipients of this solicitation not responding with a proposal should not return this solicitation, unless it specifies otherwise. Instead, they should advise the issuing office by letter, postcard, or established electronic commerce methods, whether they want to receive future solicitations for similar requirements. If a recipient does not submit a proposal and does not notify the issuing office that future solicitations are desired, the recipient's name **will** be removed from the applicable mailing list.

(End of provision)

FAR 52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a firm-fixed-price contract resulting from this solicitation.

(End of provision)

AOC52.216-3 MULTIPLE OR SINGLE AWARDS - INDEFINITE DELIVERY CONTRACTS (NOV 2004)

(a) The Government may award one indefinite-delivery indefinite-quantity (IDIQ) contract(s) resulting from the solicitation to the responsible offeror(s) whose offer(s) conform to the solicitation and will be most advantageous to the Government, cost or price and other factors specified elsewhere in this solicitation, considered.

(b) The task orders may be awarded to an offeror whose proposal is advantageous to the Government, based upon the stated evaluation criteria. Each awardee will receive a minimum

guarantee of $50,000.00 for the term of the contract. The estimated maximum amount to be ordered under this contract, encompassing all contracts awarded and including all options, is $25,000,000.00.

(c) The AOC reserves the right to award one contract covering only the initial or seed requirement.

(End of provision)

FAR 52.225-10 NOTICE OF BUY AMERICAN ACT REQUIREMENT--CONSTRUCTION MATERIALS (MAY 2002)

(a) *Definitions*. "Construction material", "domestic construction material", and "foreign construction material", as used in this provision, are defined in the clause of this solicitation entitled "Buy American Act - Construction Materials (Federal Acquisition Regulation (FAR) clause 52.225-9).

(b) *Requests for determination of inapplicability*. An offeror requesting a determination of inapplicability of the Buy American Act should submit the request to the Contracting officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of the clause at FAR 52.225-9 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act before submitting its offer or has not received a response to a previous request, the offeror shall include the information and supporting data on the offeror.

(c) *Evaluation of offers*. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act based on claimed unreasonable cost of domestic construction material, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(3)(i) of the clause at FAR 52.225-9.

(2) If the evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable costs.

(d) *Alternate offers*. (1) When an offer includes foreign construction material not listed by the Government in this solicitation in paragraph (b)(2) of the clause at FAR 52.225-9, the offeror may also submit an alternate offer based on use of equivalent domestic construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer and a separate price comparison table prepared in accordance with

paragraphs (c) and (d) of the clause at 52.225-9 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of the clause at 52.225-9 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic construction material, and the offeror shall be required to furnish such domestic construction material. An offer based on use of the foreign construction material for which an exception was requested--

(i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or

(ii) May be accepted if revised during negotiations.

(End of provision)

AOC52.228-1 OFFER GUARANTEE (JUN 2004)

(a) Failure to furnish an Offer Guarantee in the required form and amount, with and as a part of the proposal, will be cause for rejection of the proposal.

(b) The offeror shall furnish an Offer Guarantee of not less than 20% of the proposed price in the form of a firm commitment consisting of a Bid Bond, Certified Check, Cashier's Check, Irrevocable Letter of Credit, or Postal Money Order made payable to the Architect of the Capitol, or, under Treasury Department Regulations, certain bonds or notes of the United States. The Contracting Officer will return Offer Guarantees, other than Bid Bonds, (1) to unsuccessful offerors as soon as practicable after evaluation of the proposals; and (2) to the successful offeror upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the offer as accepted.

(End of provision)

END OF SOLICITATION CONDITIONS

VOLUME I I

TECHNICAL

SECTION 011101 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. **Contract Identification:** The Contract consists of an Indefinite Delivery Indefinite Quantity (IDIQ) Contract for design and construction services to support the Office of the Architect of the Capitol (AOC). Task Orders against that contract will be issued from various jurisdictions within the AOC through the AOC Procurement Division for the design services, project support, general tenent fit-out, toilet room upgrades, general painting, systems installations, concrete work, alteration, and repair of various Government facilities under the jurisdiction of the AOC. Individual Task Orders will provide specific work descriptions and technical specifications as appropriate.

1. **Informational Drawings:** Drawings provided by the AOC and indicated as "For Information Only" are included for convenience with the Contract Documents and are NOT Contract Documents. These drawings contain information requested by the AOC for the use of the Designer of Record and other consultants to the AOC. The Contractor is expected to independently verify all information shown and provide his own surveys, testing, and verification of conditions shown therein.
2. **Use of the Contract Documents:** The Contract Documents are comprised of the Drawings (produced by several disciplines), the Specifications, the Amendments, the Contract, approved Changes and other directives. These documents are not to be used separately for bid or construction as they represent the entirety of the project. The Contractor is responsible for ensuring that the documents are used together.
3. **Phasing Plan**: Normally a Phasing Plan is not included in the Task Order. The Contractor is expected to complete all work sequentially to provide the minimum disruption of parking and normal building operations in the area. The Contractor will provide his own plan for approval by the AOC showing proposed sequencing of the work and coordination with Government parking requirements.

1.2 WORK BY GOVERNMENT:

A. **Routine Maintenance**: AOC staff will need to perform general maintenance repair work on the existing mechanical/electrical equipment in the areas adjacent to or within the boundaries of this contract.

B. **Work in Adjacent Spaces**: AOC staff may be remodeling spaces in areas adjacent to work being performed by this contract.

1.3 WORK HOURS:

A. **Work Outside Normal Hours**: Normal work hours will be specified within the Task Order for each project. The Contractor shall notify the CO/COTR for approval at least 24 hours prior to commencing any work outside his normal working hours. The Contractor shall notify the CO/COTR for approval at least 72 hours prior to commencing any work during a weekend period.

1.4 WORK UNDER OTHER CONTRACTS

A. **Separate Contracts:** The Government may award separate contracts for performance of certain operations at the Project site or may have pre-existing contracts for work in effect. The Contractor will be informed in each Task Order of any contracts with which it must coordinate work.

B. **Cooperate fully** with separate contractors so work may be carried may be carried out smoothly, without interfering with or delaying work under this Contract.

1.5 GOVERNMENT FURNISHED PRODUCTS

A. **General:** Government furnished products for Contractor installation will be identified within each Task Order.

1. The AOC will arrange for and deliver Product Data, Shop Drawings, and Samples to the Contractor.
2. The Architect will arrange and pay for delivery of Government-furnished items according to the Contractor's Construction Schedule, unless otherwise indicated.

    a. After delivery, the AOC will inspect delivered items for damage. The Contractor shall be present for and assist in the AOC's inspection.
    b. If Government-furnished items are damaged, defective, or missing, the AOC will arrange for replacement.
    c. The AOC will arrange for manufacturer's field services and for delivery of manufacturer's warranties to the Contractor as required by each product.
    d. The AOC will furnish the Contractor the earliest possible delivery date for Government-furnished products. Using Government-furnished earliest possible delivery dates, the Contractor shall designate delivery dates of Government-furnished items in the Contractor's Construction Schedule.
    e. The Contractor shall review Product Data, Shop Drawings, and Samples and return them to AOC noting discrepancies or anticipated problems in use of the products.
    f. The Contractor is responsible for receiving, unloading, and handling Government-furnished items at the Project Site.
    g. The Contractor is responsible for protecting Government-furnished items from damage during storage and handling, including damage from exposure to the elements.
    h. If Government-furnished items are damaged as a result of the Contractor's operations, the Contractor shall repair or replace them.

1.6 **MISCELLANEOUS PROVISIONS**

A. **Work in the extension** of existing conditions shall correspond in all respects with the existing conditions to which it connects, or to similar existing conditions, in materials, workmanship and finish.

B. **Alterations to Existing Conditions:** Existing conditions shall be cut, drilled, removed, temporarily removed, or removed and replaced, as necessary for performance of Work under the Contract.

1. Replacements of existing conditions that are removed shall match similar existing conditions.
2. Unless otherwise indicated, existing structural members shall not be cut or altered without authorization by the CO/COTR.
3. Conditions remaining in place, which are damaged or defaced during the Work, shall be restored to the condition existing at time of award of Contract.
4. Discolored or unfinished surfaces exposed by removal of existing conditions, that are indicated to be final exposed surfaces, shall be refinished or replaced as necessary to produce uniform and harmonious contiguous surfaces.

C. **Existing utility services** shall be disconnected and removed to the extent indicated.

D. **Outside Utility Connections:** Underground and overhead utility services shall be provided complete to all points of connection indicated, and any "Limit of Contract" lines or other general limits indicated shall not apply to utility services and connections outside of these lines or limits.

F. **Removed items** indicated to remain the property of the Government shall be stored on site where directed by the CO/COTR.

1.7 **UNIT PRICES**:

A. **General**: Item's for which Unit Prices are required will be identified in the Task Order for each project. The unit prices offered in the Contractor's Proposal, shall apply to the furnishing, delivery, and installation of a unit quantity of each of the several items contained therein, and shall constitute full and complete compensation to the successful offeror for all such additional work, of pertinent character, as may be directed to be furnished and installed by the AOC; including all charges for labor, materials, equipment, plant facilities, overhead, profit, supervision, ancillary materials required for installation, and all other work in connection therewith and incidental thereto; provided however, that when the type or nature of a repair, as required by the AOC, differs from that which is indicated on the contract drawings, an adjustment in the contract price will be authorized and computed as the difference between the unit prices scheduled for the two types of repair in question.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 DELEGATED DESIGN

A. **Performance and Design Criteria:** Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to AOC.

END OF SECTION 011101

SECTION 011401 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 USE OF PREMISES

A. **Limitations on Use of the Site**: Limitations on site usage as well as specific requirements that impact site utilization are indicated on the Drawings and by other contract documents. Portions of the site beyond areas on which work is indicated are not to be disturbed. In addition to these limitations and requirements administer allocation of available space among entities needing both access and space so as to produce the best overall efficiency in performance of the total work of the project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

1. Keep existing driveways and entrances serving the premises clear and available to the Government and its employees at all times.
2. Maintain driveways between and around combustible material storage piles at least 15' wide and free of accumulation of rubbish, equipment and materials.
3. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary, obtain and pay for such storage off site.
4. Use of existing loading dock facilities will be shared with Government activities on a first-come-first-served, wait-your-turn basis.
5. Pollution-producing equipment shall not be located adjacent to or near air intakes where airborne smoke or fumes could be drawn into the building.
6. Provide 24 hours/7 days per week access of sufficient dimensions (vehicle clearances) to the project by emergency and fire-fighting vehicles and equipment.

B. **Construction Parking Control**: Parking space for personal vehicles is not available on the site. Obtain approval of Architect for parking of construction motor vehicles or other equipment on the site.

C. **Protection of Government Property**: The Contractor is expected to take all reasonable precautions to protect U.S. Government Property. In the event of damage to or theft of Government Property, the Contractor will be held fully responsible for his own personnel, his subcontractor's personnel and their actions.

D. **Protection During Use of Heat-generating Equipment**: Comply with the following procedures while performing work with heat-generating equipment, including welding, cutting, soldering,

brazing, paint removal with heat, and other operations where open flames or implements utilizing heat are used:

1. **Obtain AOC's approval and "Burn Permit"** for operations involving use of open-flame or welding equipment.

   a. *Notification* shall be given for each occurrence and location of work with heat-generating equipment.

2. **As far as practical**, use heat-generating equipment in shop areas or outside the building.
3. **Before work** with heat-generating equipment commences, furnish personnel to serve as a fire watch (or watches) for location(s) where work is to be performed.
4. **Do not perform work** with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
5. **Remove and keep the area free** of combustibles, including, rubbish, paper, waste, etc., within area of operations.

   a. *If combustible material* cannot be removed, provide fireproof blankets to cover such materials.

6. **Where possible**, furnish and use baffles of metal or gypsum board to prevent the spraying of sparks or hot slag into surrounding combustible material.
7. **Prevent the extension** of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
8. **Inspect each location** of the day's work not sooner than 30 minutes after completion of operations to detect hidden or smoldering fires and to ensure that proper housekeeping is maintained.
9. **Where sprinkler protection exists** and is functional, maintain it without interruption while operations are being performed. If operations are performed close to automatic sprinkler heads, shield the individual heads temporarily with guards.

E. **Blasting**: The use of any kind or type of explosive in the performance of the work is prohibited, except the use of construction tools actuated by or employing powder-actuated charges which shall be permitted, provided that the tool is of the kind and design ordinarily used for such construction and that the Architect has authorized its use after determining that its use will not endanger human life or safety.

F. **Mechanical/Electrical Requirements of General Work**: Except as otherwise indicated, comply with applicable provisions of The National Electrical Code (NEC) and standards by National Electrical Manufacturer's Association (NEMA) for electrical components of general work. Where applicable, provide products listed and labeled by nationally recognized independent testing and labeling organizations.

G. **All demolition,** drilling and cutting work which will result in excessive noise, which may interfere with the business activities of the building occupants, shall be performed at a time convenient to

the Government. For the purposes of bidding, such time shall be considered as between the hours of 10:00 PM and 6:00 AM. Prior to the start of any noise producing activity, the Contractor shall confer with the Architect to determine when the activity should be performed. Related requirements are also contained in Section 015001, "Temporary Facilities and Controls."

1.3 OCCUPANCY REQUIREMENTS

A. **Contractor Use of the Existing Building**: During the construction period the site and the building will be occupied by Members of Congress, other Government employees and the general public. Maintain the existing building in a safe and weather-tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period. Cooperate fully with the Architect or his representative during construction operations to minimize conflicts and to facilitate Government usage.

1. **Clear Passage**: Keep public areas such as hallways, stairs, elevator lobbies and toilet rooms free from accumulation of waste material, rubbish or construction debris.
2. **Smoking or open fires** will not be permitted within the building enclosure or on the premises.
3. **Use of Existing Elevators**: Refer to Division-1 Section, "Temporary Facilities and Controls," for designation of elevators available for use of Contractor's personnel. Use of other than designated elevators will not be permitted.

B. **Partial Government Acceptance:** The Government reserves the right to occupy and to place and install equipment in completed areas of building, before Final Acceptance, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. **The Architect** will prepare a notice of Partial Acceptance for each specific portion of the Work to be occupied before Government occupancy.
2. **Before partial Government occupancy**, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Government will provide, operate, and maintain mechanical and electrical systems serving occupied portions of building.
3. **On occupancy**, Government will assume responsibility for maintenance and custodial service for occupied portions of building.

1.4 WORKING HOURS

A. **Government Occupied Hours:** Government personnel are generally scheduled to occupy the buildings during the following hours on weekdays, Monday through Friday, except for established Government Holidays: 7:00 AM to 6:00 PM.

1. **Contractor's General Working Hours:** The Contractor working hours shall be identified within the Task Order for each project.

B. **Government Unoccupied Hours:** Government personnel are not scheduled to occupy the building during times not indicated as Government Unoccupied Hours.

C. **Contractor's Required Work During Government Unoccupied Hours:** Work required to be accomplished during Government Unoccupied Hours will be identified in the Task Order for each project and the Contractor shall include any associated costs for that Work's performance within the Price. Contractor shall submit a proposed schedule and gain the CO/COTR's approval at least 48 hours before proceeding with any work during Government Unoccupied Hours.

D. **Temporary Suspension of Work:** The Contractor shall suspend work during the periods as identified in the Task Order. Contractor shall not be entitled to an adjustment of the Contract price or time of performance as a result of this suspension of work. Note: Work will typically take place adjacent to space occupied by Congressional Staff, as such work may be suspended as a result of excessive noise or other impacts to staff.

1.5 OFF-SITE INSPECTION CENTER

A. **Security Inspections:** All deliveries must be inspected off site and placed under U.S. Capitol Police seal. The location of the inspection facility is: 4700 Shepard Parkway, S.W. (located near Exit 1 off of Interstate 295), Washington, D.C.; contact phone number is: 202-226-0905.

1. **Hours of Operation:** 5:00 AM to 2:00 PM, Monday through Friday.
2. **Required Data:** Provide letter to the United States Capitol Police, on company letterhead stationary accompanied by the signature of the owner, president, or manager. Letters shall be renewed three (3) times per year, by April 30, August 31, and December 31 and should contain the following information:

   a. AOC Project Name and Project Number.
   b. Name of the Company
   c. Name of the drivers/employees requiring access.
   d. Social Security Number and Date of Birth for each driver/employee.
   e. Buildings to be accessed.
   f. Company contact Person and telephone number. Provide information to:

   United States Capitol Police
   Operations Division
   119 D Street, N.E.
   Washington, DC 20510-7218
   FAX: (202) - 224-4505.

3. **Notification:** All Contractors shall notify the Architect a minimum of two (2) working days in advance of each delivery. In addition to the above information, provide the following information for each vehicle making a delivery: Make, model, year, color and license numbers with State.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01140

SECTION 013101 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination Drawings.
2. Administrative and supervisory personnel.
3. Project meetings.
4. Requests for Interpretation (RFIs).
5. Availability and Use of CAD Drawings.

B. **Each contractor** shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

C. **Related Sections** include the following:

1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
3. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
4. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. **RFI:** Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

A. **Coordination:** Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with 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 with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

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 AOC and separate contractors if coordination of their Work is required.

D. **Administrative Procedures:** Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors 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.

E. **Conservation:** Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Government property.

1.5 SUBMITTALS

A. **Coordination Drawings:** Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. **Content:** Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b. Indicate required installation sequences.
c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. **Sheet Size:** At least 8-1/2 by 11 inches (215 by 280) mm but no larger than 30 by 40 inches (750 by 1000 mm).
3. **Number of Copies:** Submit two opaque copies of each submittal. AOC will return one copy.

   a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. AOC will retain two copies; remainder will be returned.

4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

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 cell, and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

C. **Electronic Mail (E-Mail) Address:** The Contractor shall establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments in MicroSoft Office, Adobe Acrobat, and Word Perfect programs. Within 10 days after contract award, the Contractor shall provide the Contracting Officer a single (only one) e-mail address for electronic communications from the Contracting Officer related to this contract including, but not limited to contract documents, invoice information, requests for proposals, and other correspondence. The Contracting Officer may also use e-mail to notify the Contractor of Capitol Complex access conditions when emergency conditions warrant. Multiple e-mail addresses will not be permitted.

1. It is the Contractor's responsibility to make timely distribution of all Contracting Officer initiated e-mail with it own organization, including field office (s). The Contractor shall promptly notify the Contracting Officer, in writing, of any changes to this e-mail address.

1.6 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. **General:** In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work. Include special personnel required for coordination of operations with other contractors.

1. At sites where the combination of active Task Orders issued is less than $50,000, a lead foreman who can speak on behalf of the prime contractor is required on the site,
2. When an active Task Order or combination of active Task Orders exceeds $50,000 at a site, provide a full-time on-site superintendent.

1.7 PROJECT MEETINGS

A. **General:** Schedule and conduct meetings and conferences at Project site, unless otherwise indicated. Coordinate project meetings with required quality control activities specified under other sections.

1. **Attendees:** Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify CO/COTR and Architect/Engineer 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 AOC and Architect/Engineer, within three days of the meeting.

B. **Preconstruction Conference:** Schedule a preconstruction conference before starting construction, at a time convenient to AOC and Architect/Engineer, but no later than 15 days after execution of the Task Order. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. **Attendees:** Authorized representatives of AOC, Architect/Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; quality control staff, and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. **Agenda:** Discuss items of significance that could affect progress, including the following:

   a. Tentative construction schedule.
   b. Phasing (if applicable).
   c. Critical work sequencing and long-lead items.
   d. Designation of key personnel and their duties.
   e. Procedures for processing field decisions and Change Orders.
   f. Procedures for RFIs.
   g. Procedures for testing and inspecting.
   h. Distribution of the Contract Documents.
   i. Submittal procedures.
   j. Preparation of Record Documents.
   k. Use of the premises and existing building.
   l. Work restrictions.

m. Owner's occupancy requirements.
n. Responsibility for temporary facilities and controls.
o. Construction waste management and recycling procedures.
p. Parking availability.
q. Office, work, and storage areas.
r. Equipment deliveries and priorities.
s. First aid.
t. Security.
u. Progress cleaning.
v. Working hours.

3. **Minutes:** Record and distribute meeting minutes.

C. **Pre-installation Conferences:** Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction, including major components of equipment that require coordination with multiple trades.

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, and quality control staff shall attend the meeting. Advise AOC of scheduled meeting dates.
2. **Agenda:** Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. The Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility problems.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written recommendations.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.

w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

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 parties who should have been present.
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. **Progress Meetings:** Conduct progress meetings at bi-weekly intervals, or as identified in the Task Order. Coordinate dates of meetings with preparation of payment requests.

1. **Attendees:** In addition to representatives of AOC, and Architect/Engineer, each contractor, subcontractor, supplier, quality control staff, and other entity concerned with current progress or involved in planning or coordination of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. **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.

1) Review schedule for next period.

b. *Review present* and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.

12) Quality and work standards.
13) Status of correction of deficient items.
14) Field observations.
15) RFIs.
16) Status of proposal requests.
17) Pending changes.
18) Status of Change Orders.
19) Pending claims and disputes.
20) Documentation of information for payment requests.

c. *Minutes:* Record the meeting minutes.
d. *Reporting:* Distribute minutes of the meeting to each party present and to parties who should have been present.
e. *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.

E. **Coordination Meetings:** Conduct Project Coordination meetings at bi-weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as Progress Meetings and pre-installation conferences. However, Coordination meetings may be scheduled as an adjunct to regularly scheduled Progress Meetings.

1. **Attendees:** In addition to representatives of AOC and Architect/Engineer, each contractor, subcontractor, supplier, quality control staff, 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 conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. **Agenda:** Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. *Combined Contractor's Construction Schedule:* Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined 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. *Schedule Updating:* Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. *Review present and future needs* of each contractor present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.

4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.

3. **Reporting:** Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.8 REQUESTS FOR INTERPRETATION (RFIs)

A. **Procedure:** Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.

1. RFIs shall originate with the prime Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. **Content of the RFI:** Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Architect/Engineer.
5. RFI number, numbered sequentially.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. **Attachments:** Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

    a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. **Hard-Copy RFIs:** CSI Form 13.2 or similar format as approved by the AOC. Identify each page of attachments with the RFI number and sequential page number.

D. **Software-Generated RFIs:** Software-generated form with substantially the same content as indicated above.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

E. **AOC Action:** AOC will review each RFI, determine action required, and return it. Allow seven working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for coordination information already indicated in the Contract Documents.
   d. Requests for adjustments in the Contract Time or the Contract Sum.
   e. Requests for interpretation of AOC actions on submittals.
   f. Incomplete RFIs or RFIs with numerous errors.

2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."

   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify AOC in writing within 10 days of receipt of the RFI response.

4. On receipt of AOC action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify AOC within seven days if Contractor disagrees with response.

F. **RFI Log:** Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Software log with not less than the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect/Engineer.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date AOC response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.9 AVAILABILITY AND USE OF CAD DRAWINGS

A. **General:** After award and upon request, where electronic "Computer-Aided Design (CAD)" files exist, they will be made available to the Contractor for use in preparation of construction drawings and data related to the referenced contract, subject to the terms and conditions below.

B. **Document Security:** Unless otherwise directed, in writing, all AOC drawings and electronic copies thereof shall be considered at a minimum to be *sensitive but unclassified* (SBU).

1. ***Drawing Sheets:*** The following shall be imprinted on ***each*** page of the information:

PROPERTY OF THE UNITED STATES GOVERNMENT
FOR OFFICIAL USE ONLY
Do not remove this notice
Properly destroy documents when no longer needed

2. ***Document Cover Pages:*** The following paragraph will be included on the cover page of the information (such as the cover page on a set of construction drawings and on the cover page of the specifications) and on the label of magnetic media:

PROPERTY OF THE UNITED STATES GOVERNMENT
COPYING, DISSEMINATION, OR DISTRIBUTION OF THESE DRAWINGS, PLANS OR SPECIFICATIONS TO UNAUTHORIZED USERS IS PROHIBITED
Do not remove this notice
Properly destroy documents when no longer needed

3. ***Text Size:*** The previous two statements shall be prominently labeled in bold type in a size appropriate for the document. On a set of construction drawings, for example, the statements should be in a minimum of 14 point bold type.

C. **Hold Harmless:** Data contained on these electronic files shall not be used for any purpose other than as a convenience in the preparation of construction drawings and data for the referenced project. Any other use or reuse shall be at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor shall make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub-consultants that may arise out of or in any connection with the use of these electronic files. The Contractor to the fullest extent permitted by law, ideminify and hold the Government harmless aganst all damages, liabilities or costs, including reasonable attorney's fees and defenes costs, arising out of or resulting from use of these electronic files.

D. **Drawing Origin:** These electronic CAD drawing files may or may not be construction or "As-Built" documents. Differences may exist between the CAD files and the corresponding construction documents and/or actual construction in place. The Government makes not representation regarding the accuracy or completeness of the electronic CAD files, nor does it

make representation to the compatibility of these files with the Contractor's hardware or software. The Contractor is responsible for field verification and determining if any conflict exists. Use of these CAD files does not relieve the Contractor of duty to fully comply with contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project.

E. **Incorporation Into Project CAD Files:** If the Contractor uses, duplicates, and/or modifies these electronic CAD files for use in producing construction or as-built drawings and data related to this contract, all previous indica of ownership (seals, logos, signatures, initials, and dates) shall be removed. Construction or as-built drawings produced under this contract shall incorporate new AOC title blocks and associated data appropriate to the project for which they are developed.

F. **Transmission Media**: Arrangements should be made with the Technical Support Division early in the project to verify suitability of computer transmission media.

DO NOT TRANSMIT DRAWINGS OVER THE INTERNET OR MODEMS WITHOUT WRITTEN PERMISSION BY THE AOC!

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013101

SECTION 013201 - DESIGN & CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DESCRIPTION OF REQUIREMENTS:

A. **General Requirements:** The Contractor shall develop schedules for projects as specified. The purpose of the schedules shall be to assure a standard against which satisfactory progress shall be judged, to determine the amount of partial payments, in accordance with Paragraph 1.4.C below; to assist the CO/COTR in monitoring progress and coordinating the work with the user and other contractors; to monitor the scheduling of shop drawings, samples and procurements, and for evaluating the effect of proposed changes. The approval of submittals relating to the schedules shall not relieve the Contractor of any of its other obligations under this contract. The schedules shall be the Contractor's schedules under all circumstances for the entire duration of their contract on this project.

1.3 SUMMARY OF THE WORK:

A. **General:** Prior to the start of work, prepare and submit to the CO/COTR for acceptance a design and construction or construction schedule in the form of a progress bar chart or a fully-developed Critical Path Method (CPM) Network Schedule in accordance with this section. The Contractor may utilize bar chart progress schedules for task orders not exceeding $500,000. Use of fully-developed progress schedules (CPM networks) for task orders exceeding $500,00 is required.

B. **Bar Chart Progress Schedule**: Within fourteen (14) calendar days of the date of Task Order award, the Contractor shall prepare and submit for approval a schedule showing the order in which he proposes to perform the Work, the dates on which he will start each phase of work and the contemplated dates of completion for each phase of site. Not less than six (6) copies of this schedule shall be submitted to the Architect.

C. **Fully-Developed Progress Schedule**: Within 30 days of the date of Task Order award, the Contractor shall prepare and submit for approval a comprehensive Critical Path Method (CPM) Network type progress schedule indicating, by stage-coded symbols, a time bar for each major category or unit of work to be performed at the site; include minor elements of work which are, nevertheless, involved in overall sequencing of the work. Arrange the schedule to show how final acceptance is scheduled to allow for the AOC's procedure for certification of final acceptance. Prepare the schedule on sheets of stable transparency, or other reproducible material, to permit reproduction for the required distribution.

1. **Schedule Updating**: Following its initial approval, the project schedule shall be updated monthly for the purpose of recording and monitoring progress of the Work and establishing the values of progress payments. If the Work falls behind schedule, revise schedule and describe action to be taken to insure that work will be completed within the Contract time. Any adjustment to the Contract Time shall be made in accordance with the GENERAL CONDITIONS. For each schedule update, prepare a narrative report which shall include a description of all activities completed during the preceding month, description of progress made and planned activities listed as started but not completed on the updated Progress Schedule, and a written description and justification of any proposed revision to the logic sequence.

    a. **Contractor Revisions**: The Contractor may also request revisions to the logic sequence and schedule of the Progress Schedule in the event that his planning for the project is revised. If revisions to the approved Progress Schedule are desired, the CO/COTR shall be notified in writing for his approval, stating reasons for proposed revision. If the CO/COTR considers such proposed revisions to be of a major nature, he may require the Contractor to revise and resubmit for approval, without additional cost to the Government, all or the affected portion of the schedule to indicate the effect on the entire project. Provide two weeks notice to the CO/COTR, in writing, prior to submitting any Contractor proposed revisions not discussed in a previous Progress Meeting.
    b. **AOC Revisions**: AOC-directed revisions to the Progress Schedule will be forwarded to the Contractor with a ten (10) calender day Contractor response period. The Contractor shall either assent to the proposed change or state reasons for not implementing the proposed revision.
    c. **Progress Updates**: Revisions to the Progress Schedule made to reflect actual work progress to date are not revisions to logic sequence and schedule. In disagreements concerning actual progress recorded to date, the CO/COTR's determination shall govern.

2. **Network Diagram and Computer Printout Requirements:**

    a. **The Contractor-developed** network diagram shall show the sequence, interdependencies and time estimates for all activities required for complete performance of the work under this contract. All activities shall have durations clearly indicated on the network diagram. The logic shall consider and illustrate the following:

        1) Work (Activities) required to be completed before each activity can be started.
        2) Work (Activities) which can be done concurrently with other work.
        3) Work (Activities) required to be started immediately following the completion of each activity.
        4) Work (Activities) which may be started after the start of another activity and the time lag between the starts.

5) Work (Activities) which may be finished after the finish of another activity and the time lag between the finishes.
6) Work (Activities) which may not be started until after the finish of another activity and the time lag, if any, after the finish.

b. **In preparing the CPM schedule,** the Contractor shall make logical and consistent divisions of the work into construction activities such that the duration of each activity shall not exceed fifteen (15) working days. Should an activity require more than fifteen (15) working days, it shall be subdivided into measurable identifiable elements of fifteen (15) working days or less each. Non-construction activities (such as procurement, shipping times and concrete curing) may have duration in excess of fifteen (15) working days. The Contractor may include activities which are the responsibility of the AOC such as approvals or the inclusion of AOC supplied materials. However, these shall be subject to prior review and approval of duration and logic by the AOC.

c. **The Contractor** shall assign and submit a dollar value for each activity, subject to acceptance by the CO/COTR. The total of the activity values shall equal the contract amount. General conditions, overhead and profit shall be prorated to all the activities, unless the contractor's proposed schedule indicates a completion date earlier than that specified in the Task Order. In this case, the contractor's general conditions, overhead and profit shall be prorated over the entire time for performance specified in the Task Order. Activity values shall be related and summarized to match any schedule of values required elsewhere in this contract. The accepted activity values shall be used as the basis in determining all partial payments. For this purpose, the rate of activity value installation into the work shall be assumed to be linear with time. These values need not be included on the Network Diagram, but shall be shown on the appropriate computer printouts described in Paragraph 1.3.C.10.

d. **Submittal and procurement activities** required in the schedule shall include as a minimum the following information for each item:

1) Preparation time.
2) Review and approval time (in the event of rejection, the time necessary for re-submission and review will not be considered for any time extension to the contract duration).
3) Ordering/fabrication/delivery time.
4) Reference to appropriate specification section, drawing, etc.

e. **With exception** of any time-dependent requirements imposed by this contract in the GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, General Requirements, Specifications, Drawings and Supplements thereto, no dates or time intervals assumed and utilized by the Contractor in the preparation of his network diagram and schedule shall be binding upon, or receive the automatic acceptance of, the AOC. Errors in logic or failure of the Contractor to include any element of the work required for the performance of the contract shall not excuse him from completing all the work required for the performance of the contract within the

time for completion specified in the SUPPLEMENTARY CONDITIONS, regardless of the AOC's acceptance of the Project Schedule.

f. **The Contractor** shall provide a list of the holidays and non-work days applicable to the schedule at the first schedule submission for the contract duration plus one year.

g. **The CPM schedule** shall contain the following information for each activity:

1) Activity or Node Number.
2) Activity Description.
3) Activity Duration.
4) Performing Organization (or subcontractor responsibility).
5) Manpower by Trade (manhours for each trade).
6) Equipment (other than small tools)

h. **In preparing the CPM schedule,** the contractor shall make use of coding (in addition to that cited in other parts of this Section) that helps identify specific parts of the work. The AOC reserves the right to direct coding.

i. **The CPM schedule** shall clearly identify the component activities, and shall illustrate accomplishment of the time for completion set forth in the contract. If the work under this contract indicates an earlier completion time than set forth in the contract, the float (or slack) between the schedule and the contract completion date shall be shown on the computer printout and shall be considered to be part of the total float available to the project.

j. **Computer printouts** shall be produced (two (2) copies for the AOC by the Contractor in sorts and summaries providing breakdown as follows:

1) Node Number (ascending order).
2) Total Float (by early start and in ascending order).
3) Cumulative Cost Report; i.e., listing dollar value of each activity, to date percent completed and amount earned through current report, cost this period and cost to complete.

3. **Distribution**: Following the initial submittal to and response by the AOC, print and distribute progress schedules to the AOC (3 copies), separate contractors, the principal subcontractors and suppliers or fabricators, and others with a need-to-know schedule-compliance requirement. When revisions are made, distribute updated issues to the appropriate entities.

1.4 PROGRESS OF WORK/PARTIAL PAYMENTS:

A. **General:** The work shall be prosecuted at a rate of progress which will ensure that the Contractor will meet the specified completion dates required by the contract. By execution of the contract, the Contractor represents, in addition to those representations specifically described in the Article entitled, Site Investigation and Conditions Affecting the Work of the GENERAL CONDITIONS, that he has analyzed the work, the materials and methods involved, the systems of the building, availability of qualified mechanics and unskilled labor,

restrictions of the site, constraints imposed, his own work load and his capacity to perform the work.

B. **Project Schedule Updating:**

1. **The Schedule Updating** shall be accomplished by the Contractor and will include the following: (4 printed copies for the AOC)

   a. Activity Listing
   b. Total Float Report
   c. Update Report
   d. Cumulative Cost and Summary Cost Reports
   e. A computer disk of the updated schedule containing the information referenced above .

2. **The Project Schedule,** following its initial acceptance, shall be updated by the Contractor on a monthly basis, or more often as required, for the purpose of recording and monitoring the progress of the work and establishing the value of partial payment, in accordance with Paragraph 1.4.C below. The Contractor shall meet, as specified above, with the CO/COTR to review actual progress made to date, activities started and completed to date, and the percentages of work completed to date on each activity started but not completed. In disagreements concerning actual Progress to Date, the CO/COTR's determination will govern.
3. **If the work** under this contract falls behind schedule, or indicates a trend that the project is moving in that direction, the Contractor must provide a narrative description as well as a list of any logic changes of the action to be taken to insure that the work will be completed within the time for completion specified in the SUPPLEMENTARY CONDITIONS.
4. **The Contractor** shall submit revisions to the logic sequencing in the event the execution of his work differs from that shown on the Approved Project Schedule or if the conditions in 3. above exist. If the Contractor for any other reason desires to make changes in the Approved Project Schedule to incorporate revisions, he shall notify the CO/COTR, in writing, stating the reason for the proposed revision. If the CO/COTR considers such proposed revisions to be of a major nature, he may require the Contractor to revise and submit for approval, without additional cost to the Government, all or the affected portion of the detailed CPM schedule to show the probable effect on the entire project. The revised schedule shall not, under any circumstances, cause the project to be further behind schedule then the last update of the Contractor's schedule. The revised data shall consist of one copy of the network diagram and associated computer printouts, as well as a high density disk as discussed in Section 1.03.B.2. Within ten (10) work days from the date of his receipt of the disk, the AOC shall notify the Contractor of any discrepancies noted herein. The Contractor shall then meet with the CO/COTR for mutual acceptance of the computerized printout and network diagrams, which shall then be identified as the Accepted Project Schedule (revised Date). This revised Project Schedule shall then supersede the previously accepted schedule and shall constitute the schedule to be used by the Contractor for executing the work as outlined in Paragraph

1.2.A, above. If revision to the schedule logic sequence is contemplated, the Contractor or CO/COTR shall so advise the other, in writing, at least two (2) weeks prior to the next schedule updating, describing the revision and setting forth the reasons therefore. The next schedule update will be processed upon approval, by the CO/COTR, of the schedule revision. All reasonable requests by the Contractor for schedule revisions will be considered by the CO/COTR, and approved at his discretion. Should the Contractor not revise the schedule of the remaining work activities to reflect the new proposed sequence of work, the Contractor may be denied any reduction of retainage.

5. **Revisions to the schedule**, directed by the AOC, shall be implemented upon written notice to the Contractor. The Contractor shall provide timely response within ten (10) work days of such notice, indicating what effect the revision will have on the overall schedule. Changes to the schedule which are made on an update to reflect actual progress are not revisions to logic sequence and schedule.
6. **To the extent** that the network schedule or any revised network diagram prepared by the Contractor shows anything not jointly agreed upon, it shall not be deemed to have been accepted by the CO/COTR. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase regardless of the Contracting Officer's approval of the network schedule.
7. **When a Change Order or Supplemental Agreement** (as defined in the OFFICIAL PROCEDURES FOR MAKING CHANGES IN CONTRACTS) has been issued, the Contractor will develop and submit to the AOC, a fragnet which meets the required criteria of Section 1.3.C.1, .2, and .3. The fragnet shall be accepted prior to supplemental agreement approval. No additional charge by the Contractor shall be made for the development of fragnets. They shall be considered to be overhead cost to the Contractor.

C. **Partial Payment:** The Contractor shall provide to the AOC, on a monthly basis or more often as required, information on the percentage completion of each activity on the CPM Schedule for which work was accomplished during that monthly period. Upon approval of this progress data, by the AOC, it will be incorporated into the CPM Schedule by the Contractor and the resulting document will be issued by the Contractor as the Project Schedule Update. The Project Schedule Update shall be an integral part and basic element of the AOC's determination of the Contractor's entitlement to partial payment. If, in the judgement of the AOC, the Contractor fails or refuses to provide information required to accomplish a complete Project Schedule Update or revisions, as specified, the Contractor will be deemed to have failed to provide the AOC with a sufficient basis for determination of partial payments and until the specified information has been submitted to, and has received the acceptance of, the AOC, the Contractor shall not be entitled to such partial payments. Partial payment will be verified on the basis of the sum, for all activities, determined by multiplying percentage of completion of the activity by the activity cost value for each activity in progress.

D. **Partial Payment for Stored Materials:**

1. **In determining the amount** of any partial payment for stored materials on site, the Contractor shall meet the following requirements:

a. The "fabrication and delivery" of such equipment or "procurement and delivery" of such material have been identified as separate CPM Schedule activities, in accordance with Paragraphs 1.3.C.3 and 1.3.C.4.
b. Properly executed bills of sale therefore, and such other evidence of ownership as the CO/COTR may require, have been presented.
c. The quality and value of the equipment or material have been established, by such evidence as the CO/COTR may require, that the minimum specification requirements are met or exceeded.

2. **Except for materials and equipment** meeting the above requirements, no partial payments will be made for equipment or materials stored on site.
3. **The AOC will pay,** exclusive of retention, an amount as partial payment, verified by the Contractor in accordance with the above requirements, which have been delivered to the site of the work.

E. **Responsibility for Completion:**

1. **The Contractor** shall furnish sufficient forces, plant and equipment, and shall work such hours, including night shift and overtime operations, as necessary, to insure the prosecution of the work in accordance with the current Accepted Project Schedule. If, in the opinion of the AOC, the Contractor falls behind in meeting the schedule, the Contractor shall take such steps as may be necessary to improve his progress, and the AOC may require him to increase the hours of work (except Saturdays, Sundays and holidays), the number of shifts, overtime operations, and/or the amount of construction plant and equipment, without additional cost to the Government. The provisions of this Subsection shall not be construed as prohibiting work on Saturdays, Sundays and holidays, if the Contractor so elects and if approved. Additionally, the Contractor shall immediately reschedule activities to achieve maximum practical concurrence of accomplishment of activities.
2. **Failure of the Contractor** to comply with the requirements of this Subsection shall be a basis for determination by the AOC that the Contractor is not prosecuting the work with such diligence as will insure completion within time stipulated in the SUPPLEMENTARY CONDITIONS. Upon such determination, the AOC may terminate the Contractor's right to proceed with the work, or any separable part thereof, in accordance with the provisions of the Article entitled “Default (Fixed Price Construction)” of the GENERAL CONDITIONS, or may take such other actions as may be deemed appropriate.

F. **Adjustment of Times for Completion:**

1. **The time for completion** of the contract work will be adjusted only in accordance with the requirements of this Article, and applicable sections of the GENERAL CONDITIONS.
2. **Any request** for an adjustment of the time for completion submitted by the Contractor for changes or alleged delays shall be accompanied by a complete Time Impact Analysis,

which shall be submitted for approval within twenty-one (21) work days after the Contractor receives its initial notice.

3. **Each Time Impact Analysis** shall provide information justifying the request and stating the extent of the adjustment requested for each specific change or alleged delay. The Time Impact Analysis shall be provided to the AOC at no cost to the Government. Each Time Impact Analysis shall be in a form and content acceptable to the CO/COTR, and shall include, but not be limited to, the general information set forth in this section appropriate to the type of request (i.e., change or alleged delay), plus the following:

    a. A fragmentary CPM network (fragnet) illustrating how the Contractor proposes to have the change or alleged delay incorporated into the current Project Schedule and;
    b. Identification of the preceding and succeeding activities in the current Project Schedule to which the fragnet is to be connected, together with engineering estimates and other appropriate data justifying the proposal.

4. **The analysis** shall clearly show that the Contractor has used in full all the activity float time available for the work involved in this request.
5. **The Time Impact Analysis** shall be based upon the dates when the change or changes were issued, or the dates when the alleged delay or delays began, the status of the work at that time, and shall include time computations for all affected activities.
6. **If the Contractor** does not submit a Time Impact Analysis for a change or alleged delay, or if the CO/COTR does not agree with the Contractor's Time Impact Analysis for a change or alleged delay, the CO/COTR will determine the time impact, if any, of the change or alleged delay. The CO/COTR's determination will be final and conclusive, subject only to the Contractor's rights of appeal as provided in the Article entitled “Disputes” of the GENERAL CONDITIONS.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013201

SECTION 013301 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes administrative and procedural requirements for submitting Design Submittals, Pre-Construction Submittals, Shop Drawings, Product Data, Samples, and other submittals.

B. **Related Sections** include the following:

1. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
3. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
4. Division 01 Section "Closeout Procedures" for submitting warranties.
5. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
6. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Division 01 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of AOC's personnel.
8. Divisions 02 through 49 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. **Action Submittals:** Written and graphic information that requires AOC's responsive action.

B. **Informational Submittals:** Written information that does not require AOC's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. **General:** At Contractor's written request, copies applicable portions of AOC CAD files may be provided to Contractor for Contractor's use in connection with Project. See Section 013101, “Project Management and Coordination.”

B. **Coordination:** Coordinate preparation and processing of submittals with performance of construction activities.

1. **Coordinate each submittal** with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. **Coordinate transmittal** of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

   a. *The AOC reserves* the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. **Submittals Schedule:** Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. **Processing Time (Construction Submittals):** Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on AOC's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. **Initial Review:** Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. The AOC will advise Contractor when a submittal being processed must be delayed for coordination.
2. **Intermediate Review:** If intermediate submittal is necessary, process it in same manner as initial submittal.
3. **Resubmittal Review:** Allow 15 days for review of each resubmittal.
4. **Sequential Review:** Where sequential review of submittals by AOC's consultants, the AOC, or other parties is indicated, allow 21 days for initial review of each submittal.

E. **Identification:** Place a permanent label or title block on each submittal for identification.

1. **Indicate name of firm** or entity that prepared each submittal on label or title block.
2. **Provide a space** approximately 20 sq. inches on label or beside title block to record Contractor's review and approval markings and action taken by AOC.
3. **Include the following information** on label for processing and recording action taken:

   a. Project name.
   b. Date.
   c. Name and address of Architect.
   d. Name and address of Contractor.
   e. Name and address of subcontractor.
   f. Name and address of supplier.
   g. Name of manufacturer.
   h. Submittal number or other unique identifier, including revision identifier.

1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061001.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061001.01.A).

i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Location(s) where product is to be installed, as appropriate.
l. Other necessary identification.

F. **Deviations:** Highlight or otherwise specifically identify deviations from the Contract Documents on submittals.

G. **Changes to the Contract** will not be made by notations on submittals. In the event submittals returned by the AOC with notations, which in the opinion of the Contractor, constitute additional work for which he is entitled to an adjustment in the contract sum or the contract time, the Contractor shall comply with the procedure set forth in Article, "Changes," of the GENERAL CONDITIONS.

H. **Additional Copies:** Unless additional copies are required for final submittal, and unless AOC observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to AOC.
2. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.

H. **Transmittal:** Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. AOC will return submittals, without review, received from sources other than Contractor.

1. **Transmittal Form:** Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Transmittal number, numbered consecutively.
k. Submittal and transmittal distribution record.
l. Remarks.

m. Signature of transmitter.

2. **On an attached separate sheet**, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by AOC on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

I. **Resubmittals:** Make resubmittals in same form and number of copies as initial submittal.

1. **Note date** and content of previous submittal.
2. **Note date** and content of revision in label or title block and clearly indicate extent of revision.
3. **Resubmit** submittals until they are marked "Approved or Approved as Noted."

J. **Distribution:** Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. **Use for Construction:** Use only final submittals with mark indicating "Approved or Approved as Noted" taken by AOC.

PART 2 - PRODUCTS

2.1 DESIGN SUBMITTALS

A. **General, Quality Control:** The Design Quality Control Manager shall be responsible for reviewing and certifying that submittals are in compliance with the contract requirements prior to submission to the AOC. Complete the Contractor-originated design submittals as defined by the Task Order and coordinate with the approved production schedule.

1. Coordinate between the Designer of Record and the Construction Subcontractors to determine which design drawings will also serve as shop drawings. Indicate on the transmittal form accompanying submittal which design submittals are being submitted as shop drawings.
2. Correct and resubmit rejected submittals as directed by the CO/COTR.
3. Advise CO/COTR in writing of any variations between the Task Order requirements and the submittal.
4. Certify that design submittals are in compliance with the Task Order.

B. **Design Submittal Packages:** The AOC prefers to review as few submittal packages as possible, consistent with AOC design standards. Typically design submittals under this contract will comply with the Construction Documents phase requirements for Small and Medium projects as defined in the *AOC A/E Design Manual*. Required design submittals shall be accepted by the AOC prior to commencement of material/equipment purchase, fabrication or construction of any

element covered by that submittal. Design acceptance will be by written notification from the Contracting Officer.

a. **However**, if a submittal impacts items or equipment that are long-lead item, or any other construction activity or project element that impacts the critical path delivery of the project and that can be organized into a submittal package that can be reviewed and accepted by the AOC without being contingent upon subsequent design submittals, then it should be submitted as required to maintain project schedule.

b. **Submit three copies of a statement**, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

2. **Required Design Submittals and Government Review Durations:** The following Design Submittals are required for comprehensive, multi-discipline design packages and shall include design drawings, design analysis, Specifications, and Calculations for all project elements, fully developed to the design stage indicated within the Task Order. Times to include hands-on review meeting and preparation of government review comments:

a. *Small Projects:*

1) Informal Mid-Point Review: 3 days - in-progress and "over-the-shoulder" review (upon agreement on a suitable meeting date between the AOC and the Contractor).
2) 100% Construction Documents: 5 days (upon agreement on a suitable meeting date between the AOC and the Contractor).
3) Backcheck: 5 days for government review/verification of incorporation of corrections.

b. *Medium Projects:*

1) Completion of Design Phase: 5 days (upon agreement on a suitable meeting date between the AOC and the Contractor).
2) 100% Construction Documents: 8 days (upon agreement on a suitable meeting date between the AOC and the Contractor).
3) Backcheck: 8 days for government review/verification of incorporation of corrections.

3. **Duration of Review Requirements:** The AOC review time begins when the AOC Project Manager marks the submittal "received" and ends when the Contractor is notified of review completion. If the AOC review of a design requires a re-submittal for conformance to the Task Order, the review time of the re-submittal shall be the same as the review time for the original submittal.

4. **Final Design Submittals:** When all review comments have been resolved, submit drawings and specifications for final acceptance and signatures. Final drawing reproducibles shall bear the signatures and registration seals of the designers of record. Upon securing signatures for the accepted submittal, the AOC will return the Contractor-originated drawings to the Contractor for Contractor's printing, distribution, construction work, and preparation of Record Documents (as-builts).
5. **Review Copies:** Provide copies of each design submittal package for review in conformance with the provisions of the *AOC A/E Design Manual*. Provide electronic (CAD) submittals at the phases indicated in the *AOC A/E Design Manual*.

C. **Identification of Design Submittals:** Provide a title sheet to clearly identify each submittal, completion status, and the date. The title sheet shall use one of the AOC standard formats forwarded with the AOC CAD standards disk to the Contractor upon award of contract. The title sheet shall be unique to a particular design submittal.

D. **Design Submittal Requirements:** Refer to the requirements within the *AOC A/E Design Manual* for architectural and engineering discipline design requirements for design submittals based on AOC project size definitions. Comply with provisions of the *AOC Design Standards* and the enclosed Technical Specifications for design quality and Code provisions.

2.2 PRE-CONSTRUCTION SUBMITTALS

A. **Pre-Construction Submittals:** For each Task Order, provide the following pre-construction submittals:

1. Certificates of Insurance,
2. Surety Bonds,
3. List of Proposed Subcontractors,
4. Material Schedule,
5. Schedule of Values,
6. Shop Drawing Submittal Schedule,
7. Construction Progress Schedule,
8. Health and Safety Plan,
9. Work Plan,
10. Quality Control Plan,

B. **Material Schedule**: Prior to commencing work, submit for approval the names of manufacturers and the trade names or numbers of all materials proposed for use on the project. Do not use any material until approved by the Architect. Upon request, furnish samples of materials, without cost to the Government, for examination and testing.

1. **Submit 3 copies** of the product-listing schedule prior to commencement of the Work. Provide a written explanation for omissions of data, and for known variations from contract requirements.

C. **Schedule of Values:** Within thirty (30) calendar days of the date of contract award, a Schedule of Values shall be submitted. This schedule is defined as a work item by work item breakdown of cost of each definitive work activity including Contractor's markup. The Schedule of Values shall directly correlate with the Phases of Work indicated on the approved Progress Schedule specified below.

1. The Grand Total of all of the Schedules shall equal Contractor's original bid.
2. The proper updating of both the Schedule of Values and the Record Drawings shall be considered precedent to approval of Partial Payments.

D. **Shop Drawing Submittal Schedule:** Within thirty (30) calendar days of the date of contract award, a Shop Drawing Submittal Schedule shall be submitted. The schedule shall indicate at a minimum, all shop drawing submittals to be made, their contents, each specification section the submittal is drawn from, the date on which it will be submitted, the expected return dates, and the subcontractor responsible for creating the submittal. The submittal will be reviewed by the Architect as the first shop drawing submittal and comments made must be acknowledged and employed in the resubmission prior to the submittal of any other shop drawing. Do not "Load" the schedule.

D. **Construction Progress Schedule**: Within fourteen (14) calendar days of the date of contract award, the Contractor shall prepare and submit for approval a schedule in the required format showing the order in which he proposes to perform the Work, the dates on which he will start each phase of work and the contemplated dates of completion for each phase of site. Not less than six (6) copies of this schedule shall be submitted to the Architect.

2.3 CONSTRUCTION SUBMITTALS

A. **General:** Prepare and submit Action Submittals required by individual Specification Sections.

1. **Approval** of any submission shall not be construed as a complete or precise check of the item submitted but will only indicate that the general methods of design, detailing, construction or other elements under consideration appear to be satisfactory, without specific determinations or particulars.
2. **Do not permit** submittal copies without an appropriate final "Action" marking by the Architect to be used in connection with the work.
3. **Submissions of "Approved Equals:"** In addition to standard submittal requirements, for each item submitted as an "approved equal" submit the following:

   a. *Comparison of* proposed approved equal's characteristics with the salient characteristics of the specified product demonstrating that the proposed approved equal fully meets or exceeds the specifications,
   b. *Drawings and* samples as required for specified products,
   c. *Any changes* required in other elements (if any) because of the submission of the proposed approved equal, and
   d. *A listing of* sources of supply, maintenance service (if applicable), and replacement parts.

B. **Product Data:** Collect information into a single submittal for each element of construction and type of product or equipment.

1. **If information** must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. **Mark each copy** of each submittal to show which products and options are applicable.
3. **Include** the following information, as applicable:

   a. Manufacturer's written recommendations.
   b. Manufacturer's product specifications.
   c. Manufacturer's installation instructions.
   d. Standard color charts.
   e. Manufacturer's catalog cuts.
   f. Wiring diagrams showing factory-installed wiring.
   g. Printed performance curves.
   h. Operational range diagrams.
   i. Mill reports.
   j. Standard product operation and maintenance manuals.
   k. Compliance with specified referenced standards.
   l. Testing by recognized testing agency.
   m. Application of testing agency labels and seals.
   n. Notation of coordination requirements.

4. **Submit Product Data** before or concurrent with Samples.
5. **Initial Submittal**: Except as otherwise indicated, submit four (4) copies of each required product data submittal, plus two (2) additional copies where required for maintenance manuals. The AOC will retain two (2) copies and return the other marked with "Action" and corrections or modifications as required.

C. **Shop Drawings:** Prepare Project-specific information, drawn accurately to scale. The Contractor is encouraged to utilize reproductions of the Contract Documents, prepared under the design-build task order for the project. Consistent with utilization of AOC CAD Standards, the Contractor and the Designer of Record are encouraged to develop construction documents in a manner to facilitate use for applicable shop drawings and is free to annotate construction materials/components either generically or by use of specific brand names of products that the Contractor proposes to incorporate into the work.

1. **Preparation:** Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

   a. Dimensions.
   b. Identification of products.
   c. Fabrication and installation drawings.
   d. Roughing-in and setting diagrams.

e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Design calculations.
j. Compliance with specified standards.
k. Notation of coordination requirements.
l. Notation of dimensions established by field measurement.
m. Relationship to adjoining construction clearly indicated.
n. Seal and signature of professional engineer if specified.
o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. **Sheet Size:** Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
3. **Initial Submittal**: One correctable 1-1/2 mil translucent polyester reproducible print and one blue-line or black-line; reproducible will be returned.
4. **Final Submittal**: 3 prints, plus 2 additional prints where required for maintenance manuals; 2 will be retained and remainder will be returned, one of which is to be marked-up and maintained by Contractor as "Record Document."

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

1. **Transmit Samples** that contain multiple, related components such as accessories together in one submittal package.
2. **Identification:** Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of appropriate Specification Section.

3. **Disposition:** Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as AOC's property, are the property of Contractor.

4. **Samples for Initial Selection:** Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

   a. *Number of Samples:* Submit three full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. AOC will return submittal with options selected.

5. **Samples for Verification:** Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. *Number of Samples:* Submit three sets of Samples. AOC will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.

      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. **Product Schedule or List:** As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.
4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. AOC will return two copies.

   a. Mark up and retain one returned copy as a Project Record Document.

F. **Contractor's Construction Schedule:** Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Construction Manager's action.

G. **Submittals Schedule:** Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

H. **Application for Payment:** Comply with requirements specified in the General Conditions."

I. **Schedule of Values:** Comply with requirements specified in Division 01 Section "Payment Procedures."

J. **Subcontractor 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.
4. **Number of Copies:** Submit three copies of subcontractor list, unless otherwise indicated. AOC will return two copies.

    a. Mark up and retain one returned copy as a Project Record Document.

2.3 INFORMATIONAL SUBMITTALS

A. **General:** Prepare and submit Informational Submittals required by other Specification Sections.

1. **Number of Copies:** Submit [**two**] copies of each submittal, unless otherwise indicated. AOC will not return copies.
2. **Certificates and Certifications:** Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. **Test and Inspection Reports:** Comply with requirements specified in Division 01 Section "Quality Requirements."

B. **Coordination Drawings:** Comply with requirements specified in Division 01 Section "Project Management and Coordination."

C. **Contractor's Construction Schedule:** Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

D. **Qualification Data:** Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. **Welding Certificates:** Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. **Installer Certificates:** Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. **Manufacturer Certificates:** Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

H. **Product Certificates:** Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. **Material Certificates:** Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. **Material Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

K. **Product Test Reports:** Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. **Research/Evaluation Reports:** Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

M. **Schedule of Tests and Inspections:** Comply with requirements specified in Division 01 Section "Quality Requirements."

N. **Preconstruction Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

O. **Compatibility Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

P. **Field Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation

of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

Q. **Maintenance Data:** Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

R. **Design Data:** Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

S. **Manufacturer's Instructions:** Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

T. **Manufacturer's Field Reports:** Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service 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. Other required items indicated in individual Specification Sections.

U. **Insurance Certificates and Bonds:** Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

V. **Material Safety Data Sheets (MSDSs):** Submit information directly to AOC.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. **Review each submittal** and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to AOC.

B. **Approval Stamp:** Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 AOC DESIGN REVIEW AND COMMENT RESOLUTION

A. **The AOC** will evaluate the Contractor's design submittals and provide comments in conformance with the *AOC A/E Design Manual.*.

3.3 AOC'S ACTION - CONSTRUCTION SUBMITTALS

A. **General:** AOC will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. **Action Submittals:** AOC will review each submittal, make marks to indicate corrections or modifications required, and return it. AOC will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. **If no changes** to the drawing are required, three (3) prints and the reproducible drawing will be returned to the Contractor, bearing the stamp of the AOC, stating - "APPROVED."
2. **If changes** to the drawing are required, but are of such minor nature that fabrication and/or construction can proceed in accordance with the correction noted by the AOC without resubmission of the drawing three (3) prints and the reproducible drawing will be returned to the Contractor bearing the Stamp of the AOC stating "Approved as Noted." The Contractor shall proceed with fabrication and/or construction in accordance with the AOC's corrections, and resubmit corrected copy for the AOC's records.
3. **If changes** to the drawing are required, but are of such nature that fabrication or construction cannot proceed, three (3) prints and the reproducible drawing will be returned to the Contractor, bearing the stamp of the AOC stating - "Revise and Resubmit." In such a case, the Contractor shall resubmit the drawings, properly corrected. Upon resubmission of shop drawings, if any corrections or changes are made other than those marked by the AOC, the Contractor shall clearly indicate any such corrections or changes made on his own initiative.
4. **If the product does not meet** the specification requirements, the number of copies outlined above will be returned to the Contractor, bearing the stamp of the AOC stating - "REJECTED." In such a case, the Contractor shall submit a new product which complies with the technical specifications.

5. **Other Action**: Where the submittal is returned, marked with the AOC's explanation, for special processing or other Contractor activity, or is primarily for information or record purposes, the submittal will be marked as follows:

   a. *Not Subject to Review:* This review category will apply to submittals which are not required by the Contract Documents and are inadvertently submitted and stamped; or
   b. *Received/No Action Required:* This category will be used when returning "Informational Submittals" for which the AOC is not required to take action.

C. **Informational Submittals:** AOC will review each submittal and will not return it, or will return it if it does not comply with requirements. AOC will forward each submittal to appropriate party.

D. **Partial submittals** are not acceptable, will be considered nonresponsive, and will be returned without review.

E. **Submittals not required** by the Contract Documents may not be reviewed and may be discarded.

F. **Miscellaneous Submittals**:

1. **Inspection and Test Reports**: Classify each inspection and test report as being either "shop drawings" or "product data" depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the point of production. Process inspection and test reports accordingly.
2. **Offsite Fabrication Facilities**: Provide for scheduled visits to off site fabrication facilities by the Architect. Make all facilities, including storage areas and plant, open and accessible to review of procedures, materials used and storage and shipping methods.
3. **Warranties**: Refer to Article "Products" for specific general requirements on warranties, product bonds, workmanship bonds and maintenance agreements. In addition to copies desired for the Contractor's use, furnish 2 executed copies of such warranties, bonds or agreements. Provide 2 additional copies where required for maintenance manuals.
4. **Staging Plan**: The AOC has indicated in the Task Order where the Contractor can stage the construction. Submit a Staging Plan indicating specific locations of the superintendent's trailer, storage and loading of materials, traffic direction and control concept and signage, security perimeter for staging area, locations of informational construction signage, locations of temporary toilets and other temporary construction, emergency facilities and resources and any other construction facilities required.
5. **Traffic Control**: Submit a site plan and details for review and approval by the Architect to diagrammatically indicate proposed measures for safely and efficiently controlling and re-routing traffic as necessary to enable construction work, deliveries, paving, testing operations and other activities. Indicate schedules of activities occurring hourly before, during and after the normal workday. At all times provide minimal disruption to the day-to-day activities occurring on the site and at adjacent locations.
6. **Safety Plan:** Provide a Safety Plan, in accord with Division 1 section "Safety and Health." Plan shall meet OSHA and AOC safety Guidelines for work in hazardous environments (areas where high voltage and large moving equipment are found), shall define number of

individuals on the job site(s), their training, typical safety equipment to be used, and procedures for addressing typical hazardous conditions.

END OF SECTION 013301

SECTION 014001 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes administrative and procedural requirements for both design and construction 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 AOC or authorities having jurisdiction are not limited by provisions of this Section.

C. **Related Sections** include the following:

1. Division 01 Section "Allowances" for testing and inspecting allowances.
2. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
3. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
4. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.3 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 AOC.

C. **Mockups:** Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.

D. **Laboratory Mockups:** Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.

E. **Preconstruction Testing:** Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

F. **Product Testing:** Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

G. **Source Quality-Control Testing:** Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

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

I. **Testing Agency:** An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

J. **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. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

K. **Experienced:** When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

L. **Specialist**: The term "specialist" is defined as an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the contract specification requires installation by a specialist, that term shall also be deemed to mean either the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer's direct supervision.

1.4 SUBMITTALS

A. **Design Quality Control Plan:** Submit the Design Quality Control (DQC) Plan within 21 days of receipt of Notice of Award.

B. **Construction Quality Control Plan:** Submit the Construction Quality Control (CQC) Plan within 21 days of receipt of Notice of Award.

C. **Qualification Data:** For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

D. **Schedule of Tests and Inspections:** Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

E. **Reports:** Prepare and submit certified written reports that 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.

F. **Permits, Licenses, and Certificates:** For AOC'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.

1.5 QUALITY CONTROL

A. **General:** Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. **DQC Manager Qualifications:** The DQC Manager shall be a design Architect or Engineer who can demonstrate a minimum of 5 projects of similar size and type designs executed within the past five years. Submit a resume on the DQC Manager qualifications for approval of the CO/COTR. Provide education, experience, and management capabilities on similar size and type contracts. In addition, the DQC Manager shall be a registered architect or engineer with active registration in State or District of Columbia as applicable to where the projects will be constructed. Provide proof of registration as part of the resume submittal package.

C. **CQ Manager Qualifications:** An individual with combined experience in the following positions: superintendent, QC Manager, project manager, project engineer or construction manager for a minimum of 10 projects of similar size and type executed within the past five years which included the major trades that are part of this Contract.

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. **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.

F. **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.

G. **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 are similar to those indicated for this Project in material, design, and extent.

H. **Specialists:** Certain sections of the Specifications 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. Requirement for specialists shall not supersede building codes and regulations governing the Work.

I. **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 548; 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.

J. **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.

K. **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 AOC 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.

L. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by AOC.
2. Notify AOC seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain AOC approval of mockups before starting work, fabrication, or construction.

   a. Allow seven days for initial review and each re-review of each mockup.

5. **Maintain mockups** during construction in an undisturbed condition as a standard for judging the completed Work.
6. **Demolish and remove** mockups when directed, unless otherwise indicated.

M. **Laboratory Mockups:** Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 02 through 49.

1.5 DESIGN QUALITY CONTROL

A. **DQC Manager:** Provide a DQC Manager as a key person for the design, who is responsible for the design integrity, professional design standards

B. **Design Quality Control Plan:** The Contractor's Designer of Record's organization shall provide and maintain a DQC Plan as an effective quality control program which will assure that all design services required by this contract are performed and provided in a manner that meets generally accepted professional architectural and engineering quality standards and that comply with published *AOC Design Standards* and specific Statements of Work under each Task Order. As a minimum, competent, independent professional reviewers identified in the DQC Plan shall technically review all documents. The Contractor shall correct errors and deficiencies in the design documents, identified by the DQC's review efforts, prior to submitting them to the AOC. Provide for acceptance by the CO/COTR, a DQC Plan that includes the following:

1. A Table of Contents listing the major sections in the following order:

   a. DQC Organization.
   b. Name, Qualifications and Duties of the DQC Manager.
   c. Design Organizations.
   d. Appointment Letters.
   e. Submittal Procedures.
   f. List of Design Deliverables.
   g. Documentation Procedures and Status reports.

h. Systems List.

2. A chart showing the DQC organizational structure.
3. Name and Qualifications, in resume format, along with the Duties responsibilities and authority of the DQC Manager as specified in this specification.
4. Design Organizations such as the prime Architect/Engineer and any consulting engineering firms or individual professionals assigned to this Project Design Team. Provide the names and professional affiliation of all the Design team members assigned to this Project.
5. A letter signed by an officer of the Contractor firm appointing the DQC Manager and stating that he.she is responsible for implementing and managing the DQC Program as described in this contract. Include in this letter the responsibilities of the DQC Manager to implement and manage the Design portion of this contract and his/her authority to change the design or direction of design, which may not be in compliance with the Task Order. Also report that the DQC Manager shall report to the QC Manager as required.
6. Provide a description of the management and controls process proposed for reviewing, approving and managing design submittals.
7. The list of design deliverables will be identified in the Task Order for each project.
8. Indicate documentation procedures including weekly DQC Reports to the QC Manager. Maintain current and complete records of design activities, providing a weekly design status report to the QC Manager and the CO/COTR.
9. A listing of systems for each Task Order project that will require commissioning.

C. **Required DQC Deliverables:** Provide the following:

1. **DQC Documentation:** DQC Documentation is required for all Task Orders for projects requiring design, unless otherwise indicated. The DQC Manager shall provide the DQC Reports. Include in this report the minutes and status of all design meetings, site visits, inspections, and schedule related activities as required in the contract.
2. **DQC Certification:** Provide DQC certification as required.

D. **Acceptance of DQC Plan:** Acceptance of the Contractor's DQC Plan is required prior to continuing design after contract award and prior to commencing work on any Task Order that requires design services. Acceptance is conditional and will be predicated on satisfactory performance during design and construction. The AOC reserves the right to require the Contractor to make changes in the DQC Plan and operations, including removal of the DQC Manager or other design personnel, as necessary, to obtain the quality of design specified. The CO/COTR will notify the Contractor, in writing, of the acceptance of the DQC Plan. After acceptance, any changes proposed by the Contractor are subject to the acceptance of the CO/COTR.

E. **DQC Plan Meeting:** Prior to the start of design and following the Post Award Kick-Off Meeting, the DQC Manager and his/her design architect/engineer team shall meet with the CO/COTR to discuss the DQC Plan and schedule requirements of this contract. The purpose of this meeting is to develop a mutual understanding of the DQC Plan requirements prior to plan development and submission.

F. **DQC Meetings:** After the start of a design under this contract, the DQC Manager shall conduct at a minimum, monthly meetings with the design team. The CO/COTR shall be given the opportunity to participate in the meeting. The DQC shall prepare minutes of these meetings that provide: Progress and status of design, schedule performance with details and correction periods, provide all forward planning ideas to keep design on schedule, and provide updates on any changes to schedules. A copy of the meeting minutes shall be provided to the CO/COTR and shall be included in the DQC Plan. Notification of all monthly meetings shall be given at least 5 days in advance.

1. Review the minutes of the previous meeting;
2. Review the schedules(s) and status of work;
3. Update the schedule(s) showing actual start/finish dates, new activities, new relationships, remaining durations and establish new planned dates;
4. Review work to be accomplished in the next 4 weeks and documentation/submittals required;
5. Assist in resolving Request for Information issues; and
6. Address items that may require revising the DQC or QC Plans.

1.6 CONSTRUCTION QUALITY CONTROL

A. **AOC Responsibilities:** Where quality-control services are indicated as AOC's responsibility, AOC will engage a qualified testing agency to perform these services.

1. AOC 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. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. 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 and the Contract Sum will be adjusted by Change Order.

B. **QC Manager:** Provide a QC Manager as a key person for the design, who is responsible for the design integrity, professional design standards

C. **Construction Quality Control Plan:** The Construction QC Plan documents the proposed method and responsibilities for assuring construction quality and accomplishing commissioning activities during the construction of the project. Provide for acceptance by the CO/COTR, a Construction QC plan that covers both on-site and off-site work and includes the following:

1. **A Table of Contents** listing the major sections in the following order:

   a. DQC Organization.
   b. Name, Qualifications and Duties of the DQC Manager.
   c. Design Organizations.

d. Appointment Letters.
e. Submittal Procedures and initial submittal resgiter;
f. Testing Laboratory Information;
g. Testing Plan and Log;
h. Procedures to Complete Rework Items;
i. Documentation Procedures;
j. List of Definable Features;
k. Procedures for Performing the Three Phases of Control.

2. **A chart** showing the QC organizational structure.
3. **Names and qualifications**, in resume format, for each person in the QC organization.
4. **Duties**, responsibilities, and authorities of each person in the QC organization.
5. A listing of outside organizations such as architectural and consulting engineering firms that will be employed by the Contractor and a description of the services these firms will provide.
6. **Letters signed** by an officer of the firm appointing the QC Manager and stating that he/she is responsible for implementing and managing the QC program as described in this contract. Include in this letter the responsibility of the QC Manager to implement and manage the three phases of quality control, and his/her authority to stop work which is not in compliance with the contract. The QC Manager shall issue letters of direction to all QC specialists outlining their duties, authorities, and responsibilities. Copies of the letters shall be included in the QC plan.
7. **Procedures** for reviewing, approving, and managing submittals. Provide the names of persons in the QC organization authorized to review and certify submittals prior to approval.
8. **Testing laboratory** information as required elsewhere in this specification.
9. **Procedures** to identify, record, track, and complete rework items.
10. **Documentation procedures**, including proposed report formats.
11. **The list** of definable features of work that are cross-referenced to the contractor's Construction Schedule.
12. **Procedures for Performing the Three Phases of Control:** For each definable unit of work, provide the Preparatory and Initial Phase Checklists. Each list shall include a breakdown of quality checks that will be used when performing the quality control functions, inspections, and tests required by the contract documents. The Preparatory and Initial Phases and meetings shall be conducted with a view towards obtaining quality construction by planning ahead and identifying potential problems for each unit of work. Checklists shall be updated as additional units of work are added to the plan. The initial list shall include those units of work covered under the first Task Order for a project.

D. **Coordination and Mutual Understanding Meeting:** After submission of the QC Plan, and prior to the start of construction under each Task Order, the QC Manager and QC personnel will meet with the CO/COTR to present the QC Program required by this contract.

E. **QC Meetings:** After the start of construction under each Task Order, the QC Manager or designated QC personnel shall conduct weekly QC meetings at the work site with the project

superintendent, DQC Manager (if design services are required under the Task Order) to discuss all active Task Order work. Prepare minutes and provide a copy to the CO/COTR within 2 working days after the meeting. The CO/COTR may attend these meetings. At a minimum, the following shall be accomplished at each meeting:

1. Review minutes of the previous meeting,
2. Review the schedule and status of work,
3. Review the status of submittals,
4. Review the work to be accomplished in the next 2 weeks,
5. Resolve QC and production problems,
6. Address items that may require revising the QC plan, and
7. Review health and safety plan.

F. **Three Phases of Control:** The Three Phases of Control shall adequately cover both on-site and off-site work and shall include the following:

1. **Preparatory Phase:** Notify the CO/COTR at least 2 work days in advance of each preparatory phase. This phase shall include a meeting conducted by QC personnel and attended by the DQC Manager (if design services are required under the Task Order), the superintendent, and the foreman responsible for the definable feature of work. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Preparatory Phase Checklist. Perform the following prior to beginning work on each definable unit of work:

   a. *Review* each paragraph of the appicable specification sections,
   b. *Review* the contract drawings,
   c. *Verify* that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required,
   d. *Review testing plans* to ensure that provisions have been made to provide the required QC testing,
   e. *Examine work area* to ensure that the required preliminary work has been completed,
   f. *Examine* the required materials, equipment, and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data,
   g. *Discuss construction methods*, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each unit of work,
   h. *Review the safety plan* and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required Material Safety data Sheets are submitted.

2. **Initial Phase:** Notify the CO/COTR at least 2 work days in advance of each initial phase. When construction crews are ready to start work on a unit of work, conduct the initial phase with QC personnel and attended by the DQC Manager (if design services are required under the Task Order), the superintendent, and the foreman responsible for the definable feature

of work. Observe the initial segment of the unit of work to ensure that the work complies with Contract requirements. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Initial Phase Checklist. Perform the following on each definable unit of work:

a. Establish the quality of workmanship required,
b. Resolve conflicts,
c. Ensure that all applicable testing is performed by the approved laboratory, and
d. Check work procedures for compliance with the Safety Plan and the appropriate activity hazard analysis to esnure that applicable safety requirements are met.

3. **Follow-Up Phase:** Perform the following for on-going work daily, or more frequently as necessary until completion of each unit of work and document in the daily Contractor Quality Control report.

a. Ensure work is in compliance with Contract requirements,
b. Maintain quality of workmanship required,
c. Ensure that the approved laboratory performs all applicable testing,
d. Ensure that rework items are being corrected, and
e. Perform safety inspections.

G. **Tests and inspections** not explicitly assigned to AOC are Contractor's responsibility. 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.

1. **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 AOC, unless agreed to in writing by CO/COTR.

2. **Notify testing agencies** at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
3. **Where quality-control services** are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. **Testing and inspecting** requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. **Submit additional copies** of each written report directly to authorities having jurisdiction, when they so direct.

H. **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."

I. **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.

J. **Testing Agency Responsibilities:** Cooperate with CO/COTR and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify CO/COTR and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

K. **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.

L. **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.

M. **Schedule of Tests and Inspections:** Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.

1. **Distribution:** Distribute schedule to CO/COTR, Contractor, and testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.7 SPECIAL TESTS AND INSPECTIONS

A. **Special Tests and Inspections:** Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying CO/COTR and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to CO/COTR with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. **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 AOC.
4. Identification of testing agency or special inspector conducting test or inspection.

B. **Maintain log at Project site.** Post changes and modifications as they occur. Provide access to test and inspection log for AOC's reference during normal working hours.

3.2 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. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."

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 014001

SECTION 014201 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. **General:** Basic Contract definitions are included in the Conditions of the Contract.

B. **"Approved":** When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. **"Concealed":** The term "concealed" is defined as an item or space not normally seen, occupied or used by building occupants or staff, such as shafts, hoistways, tunnels, ceiling plenums, attics, and crawls spaces.

D. **"Directed":** A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."

E. **"Exposed":** The term "exposed" is defined as an item or surface, exterior or interior, which can be seen by a person outside the building or a person inside a usable space within the building during normal activity.

1. Mechanical and electrical rooms, air handling rooms, storage rooms and penthouses shall be considered to have exposed surfaces, as shall the mechanical and electrical construction within them.
2. The interiors of closets and alcoves shall be considered exposed surfaces, and shall be finished to match the finish of the adjoining room or space, unless another finish is otherwise indicated.
3. The interiors of cabinets shall be considered exposed, but a finish different from that of the exterior may be permitted or required by other sections.

F. **"Finished Space":** The term "finished space" is defined as space normally used by the public, building occupants or staff for primary functions of the building, but does not include mechanical, electrical and elevator equipment rooms, hoistways, tunnels or mechanical penthouses, unless otherwise indicated.

G. **"Furnish":** Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

H. **"Indicated":** Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

I. **"Install":** Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

J. **"Project Site":** Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

K.. **"Provide":** Furnish and install, complete and ready for the intended use.

L. **"Regulations":** Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

M. **"Specialist":** The term "specialist" is defined as an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the contract specification requires installation by a specialist, that term shall also be deemed to mean either the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer's direct supervision.

1.3 FORMAT AND SPECIFICATION CONTENT EXPLANATIONS

A. **General - Bolding and underscoring:** Are used strictly to assist reader of specification text in scanning text for key words (for quick recall). No emphasis on or relative importance is intended where bolding and underscoring are used. Imperative language is used generally in specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by the Contractor. For clarity of reading at certain locations, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by Contractor, or when so noted, by others.

1. **Abbreviations**: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with titles of general standards which are frequently abbreviated. 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.

2. **Minimum Quality/Quantity**: In every instance, the quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may surpass the quality of that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimum or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to the Architect for decision before proceeding.

B. **Overlapping and Conflicting Requirements**: Where there appears to be overlapping or conflicting requirements in the drawings and specifications, refer all such questions in writing to the Architect for interpretation. Do not proceed with that portion of the work that is under question until the Architect has replied in writing. Delays necessitated by requests for interpretation shall not form the basis for a Change to the contract. The Architect's interpretation and decision shall be final. Procedures for resolving disagreements with the decision of the Architect are outlined in the General Conditions of the Contract. The order of precedence is established as follows:

1. **Order of Precedence:** Any inconsistency in this solicitation or Contract shall be resolved by giving precedence in the following order:

   a. The Schedule (excluding the specifications).
   b. Representations and other instructions.
   c. Contract clauses.
   d. The Specifications.
   e. The Drawings. Large scale drawings take precedence over small scale drawings. Do not scale drawings.

2. **Industry Standards**: Where compliance with two (2) or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement is intended and will be enforced, unless specifically detailed language written into contract documents clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to the Architect for a decision before proceeding.
3. **Contractor's Options**: Except for overlapping or conflicting requirements, where more than one set of requirements are specified for a particular unit of work, Options are intended to be the Contractor's regardless of whether or not it is specifically indicated as such.

C. **Drawing Symbols**: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., Ninth edition.

1. **Mechanical/Electrical Drawings**: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where

appropriate, these symbols are supplemented by more specific symbols as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding.

1.4 INDUSTRY STANDARDS

A. **Applicability of Standards:** Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. **Publication Dates:** Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

C. **Copies of Standards:** Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

D. **Abbreviations and Acronyms for Standards and Regulations:** Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(888) 293-6498 (202) 512-1530
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point www.dodssp.daps.mil	(215) 697-6257
FS	Federal Specification Available from Department of Defense Single	(215) 697-6257

	Stock Point www.dodssp.daps.mil	
	Available from General Services Administration www.fss.gsa.gov	(202) 501-1021
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

1.5 **ABBREVIATIONS AND ACRONYMS**

A. **Industry Organizations:** Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(202) 862-5100
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	ACI International (American Concrete Institute) www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530

AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association (Now part of CPA)	
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALCA	Associated Landscape Contractors of America www.alca.org	(800) 395-2522 (703) 736-9666
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute	(202) 682-8000

	www.api.org	
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (212) 591-7722
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (703) 733-0600
AWPA	American Wood-Preservers' Association www.awpa.com	(334) 874-9800
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
	Cast Stone Institute www.caststone.org	(770) 972-3011

CCC	Carpet Cushion Council www.carpetcushion.org	(203) 637-1312
CDA	Copper Development Association Inc. www.copper.org	(800) 232-3282 (212) 251-7200
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	(301) 670-0604
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(800) 463-6727 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945

EJCDC	Engineers Joint Contract Documents Committee www.asce.org	(800) 548-2723 (703) 295-6300
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
FCI	Fluid Controls Institute www.fluidcontrolsinstitute.org	(216) 241-7333
FM	Factory Mutual System (Now FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute (610) 522-8440 www.geosynthetic-institute.org	
HI	Hydraulic Institute www.pumps.org	(888) 786-7744 (973) 267-9700
HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
IAS	International Approval Services (Now CSA International)	
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369

ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
IGMA	Insulating Glass Manufacturers Alliance (The) www.igmaonline.org	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(702) 567-8150
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864 (847) 577-7200
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Maple Flooring Manufacturers Association www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association www.metalframingmfg.org	(312) 644-6610
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.	(703) 281-6613

	www.mss-hq.com	
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(281) 228-6200
NAIMA	North American Insulation Manufacturers Association (The) www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-3550
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(303) 697-8441
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NGA	National Glass Association www.glass.org	(703) 442-4890

NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association www.nofma.org	(901) 526-5016
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. www.ntma.com	(800) 323-9736 (540) 751-0930
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.ce.uiuc.edu	(217) 333-3929
PTI	Post-Tensioning Institute www.post-tensioning.org	(602) 870-7540
RCSC	Research Council on Structural Connections www.boltcouncil.org	(800) 644-2400 (312) 670-2400
RFCI	Resilient Floor Covering Institute www.rfci.com	(301) 340-8580
RIS	Redwood Inspection Service	(888) 225-7339

	www.calredwood.org	(415) 382-0662
SAE	SAE International www.sae.org	(724) 776-4841
SDI	Steel Deck Institute www.sdi.org	(847) 462-1930
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(516) 294-5424
SEI	Structural Engineering Institute www.seinstitute.com	(800) 548-2723 (703) 295-6195
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)	
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPFA	Spray Polyurethane Foam Alliance www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	SPRI (Single Ply Roofing Institute) www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings	(877) 281-7772

	www.sspc.org	(412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703)907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(608) 833-5900
TPI	Turfgrass Producers International (800) 405-8873 www.turfgrasssod.org (847) 705-9898	
TRI	Tile Roofing Institute (Formerly: RTI - Roof Tile Institute) www.tileroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(800) 285-4476 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USGBC	U.S. Green Building Council www.usgbc.org	(202) 828-7422
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association (Now WCSC)	

WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association) www.windowcoverings.org	(800) 506-4636 (212) 661-4261
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

B. **Code Agencies:** Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ICC	International Code Council (Formerly: CABO - Council of American Building Officials) www.iccsafe.org	(703) 931-4533
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543
NES	National Evaluation Service (See ICC-ES)	

C. **Federal Government Agencies:** Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers www.usace.army.mil	
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-6816
DOC	Department of Commerce www.commerce.gov	(202) 482-2000

DOD	Department of Defense www.dodssp.daps.mil	(215) 697-6257
DOE	Department of Energy www.eren.doe.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111 (202) 501-1888
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PHS	Office of Public Health and Science http://phs.os.dhhs.gov	(202) 690-7694
USDA	Department of Agriculture www.usda.gov	(202) 720-2791

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014201

SECTION 015001 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

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

B. **Related Sections** include the following:

1. Division 01 Section "Summary" for limitations on utility interruptions and other work restrictions.
2. Division 01 Section "Multiple Contract Summary" for division of responsibilities for temporary facilities and controls.
3. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
4. Division 01 Section "Execution" for progress cleaning requirements.
5. Divisions 02 through 49 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.
6. Division 32 Section "Dewatering" for disposal of ground water at Project site.
7. Division 31 Section "Termite Control" for pest control.
8. Division 31 Section "Asphalt Paving" for construction and maintenance of asphalt paving for temporary roads and paved areas.
9. Division 32 Section "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

1.3 DEFINITIONS

A. **Permanent Enclosure:** As determined by CO/COTR, permanent or temporary roofing is complete, insulated, and weather-tight; exterior walls are insulated and weather-tight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. **General:** Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, AOC staff, AOC construction forces, CO/COTR, testing agencies, and authorities having jurisdiction.

1. **Use Charges**: No cost or usage charges for temporary services or facilities are chargeable to the Government. Cost or use charges for temporary services or facilities will not be accepted as a basis of claims for a change-order extra. All materials and equipment provided by the Contractor for temporary facilities shall remain the property of the Contractor.
2. **Materials and Execution**: Provide new materials and equipment for temporary services and facilities; used materials and equipment that are undamaged and in serviceable condition may be used, if acceptable to the CO/COTR. Provide only materials and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards. Do not use materials of temporary service in permanent installation.

1.5 SUBMITTALS

A. **Site Plan:** Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.6 QUALITY ASSURANCE

A. **Quality Assurance**: Comply with the requirements of the *International Building Codes* and regulations governing construction and local industry standards, in the installation and maintenance of temporary services and facilities.

1. **Standards**: Comply with the requirements of NFPA Code 241, "Building Construction and Demolition Operations", the ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and the NECA National Joint Guideline NJC-6 "Temporary Job Utilities and Services."

   a. *Refer* to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", as prepared jointly by Associated General Contractors of America (AGC) and American Specialty Contractors, Inc. (ASC) for industry recommendations.
   b. *Trade Jurisdictions:* The assigned responsibilities for the installation and operation of temporary utilities are not intended to interfere with the normal application of trade regulations and union jurisdictions applicable to the work.

2. **Inspections**: Inspect and test each service before placing temporary utilities in use. Arrange for required inspections and tests by governing authorities, and obtain required certifications and permits for use.

   a. *Electric Service:* Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

1.7 PROJECT CONDITIONS

A. **Temporary Use of Permanent Facilities:** Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use

as a construction facility before Government's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. **Pavement:** Comply with Division 32 Article "Asphalt Paving."

B. **Lumber and Plywood:** Comply with requirements in Division 06 Article Rough Carpentry."

C. **Gypsum Board:** Minimum 1/2 inch (12.7 mm) thick by 48 inches (1219 mm) wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.

D. **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.

E. **Paint:** Comply with requirements in Division 09 painting Sections.

2.2 TEMPORARY UTILITIES

A. **General**: The Architect will designate a connection point for installation of temporary service to the project to existing service. Arrange with the CO/COTR for an acceptable time when service can be interrupted, where necessary to make connections for temporary services. Unless otherwise noted, power interruptions shall be restricted to weekends or during Government Unoccupied hours. The Contractor shall schedule power interruptions and obtain approval for them with the Superintendent's Office a minimum of one week in advance of the requested interruption.

B. **Temporary Electric Power Service**: Electrical energy will be supplied by the Government, but the Contractor shall install and maintain all necessary conduit, wiring, and devices needed to execute the work. Install all wiring in flexible conduit or armored cable with minimum No. 12 gage wire. Portable cords for small power tools shall be properly grounded and installed as approved by the CO/COTR. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for plug-in connection of power tools and equipment. The Government will not be held responsible for power outages beyond its control.

1. **Comply with applicable NEMA**, NECA and UL standards and governing regulations for materials and layout of temporary electric service, including those requirements included in Division-16 sections.
2. **Install service and grounding** in compliance with the *National Electric Code* (NFPA 70), the *International Building Code*, and Power Company requirements. Include necessary service connection, service switch, meters, transformers, overload protected disconnect, main distribution switch gear, panelboards, wiring, cables, devices, and accessories.

C. **Temporary Lighting**: Provide local switching of temporary lighting, spaced to allow lighting to be turned off in patterns to conserve energy and retain light suitable for work-in-progress, access traffic, security check and project lock-up.

1. **Provide general service incandescent lamps** of wattage indicated or required for adequate illumination. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide exterior fixtures where fixtures are exposed to weather or moisture. Keep sockets equipped with active lamps. Where feasible, utilize fluorescent type fixtures.

D. **Temporary Heating, Cooling and Ventilating**: Provide temporary heating, cooling, and ventilating where indicated or needed for performance of the Work, curing or drying of recently installed work or for protection of work in place from adverse effects of low temperatures or high humidity. Select facilities known to be safe and without deleterious effect upon the work in place or being installed. Coordinate with ventilation requirements to produce the indicated ambient condition required, to minimize the consumption of fuel or energy, and to comply with code requirements.

1. **Maintain** a minimum temperature of 50 deg. F (7 deg. C) in permanently enclosed portions of the building and areas where finished work has been installed. Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the fuel being consumed. Do not use open burning or salamander type heating units where prohibited by governing codes or regulations, or when combustible materials are located in or near the space being heated, or when the work installed or being installed includes work which will be exposed to view in the completed project.

   a. *Do not store* fuel in building.

2. **Provide for ventilation** requirements where possible through use of natural ventilation, utilizing temporary heat and enclosures and openings to effect needed movement of air. Where necessary, install temporary fans or blowers to provide ventilation of construction spaces. Where necessary, operate units with filters and baffles to avoid distribution of dust and fumes and to minimize deleterious effects upon work. Equip portable ventilating fans with suitable safety guards.
3. **As soon as practical**, after permanent system is in place and operable, provide heat from the permanent building heating system, under operation and supervision of personnel authorized by the equipment manufacturer, until the building is complete.

   a. *Permanent system* may be operated without diffusers and registers in place, but filters with same efficiency as those specified for permanent system must be installed in ductwork.
   b. *Immediately prior* to acceptance by the Government, clean ducts and replace all used filters with new ones.

E. **Temporary Telephones**: Arrange for the local telephone company to install temporary service to the project or provide cellular service to the contractor's site superintendent. Location of telephones and telephone wires is subject to CO/COTR's approval.

F. **Water Service**: Water will be provided for project use by the Government at existing sources. Provide temporary piping, connections, maintenance and other work required to deliver water required for the project. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans. Provide suitable back-flow preventers.

G. **Temporary Sanitary Facilities**: Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Use of the designated existing Government toilet facilities, will be permitted, provided these facilities are properly cleaned and maintained in a condition acceptable to the Government. Immediately prior to Final Acceptance, restore these facilities to the condition prevalent at the time of initial use. Do not clean tools or equipment in building toilet rooms.

1. **Temporary Sanitary Facilities**: For new facilities or for facilities in which existing Government facilities do not exist, provide sanitary facilities and comply with governing regulations including safety and health codes for the type, number, location, operation and maintenance of fixtures and facilities; provide not less than specified requirements. Install in locations that will best serve the project's needs. Do not use permanent toilet fixtures during construction period.

   a. *Supply and maintain* toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility. Provide appropriate covered waste containers for used material.

H. **Temporary Fire Protection**: Until fire protection needs may be fulfilled by permanent facilities, install and maintain temporary fire protection facilities of the types needed to adequately protect against reasonably predictable and controllable fire losses. Comply with applicable recommendations of NFPA Standard 10 "Standard for Portable Fire Extinguishers". Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher on each floor at or near each usable stairwell. Store combustible materials in clearly-labeled containers in recognized fire-safe locations.

1. **Develop and supervise** an overall fire prevention and first aid fire protection program for personnel at the project site.
2. **Provide type "A" fire extinguishers** for temporary offices and similar spaces where there is minimal danger of electrical or grease-oil-flammable liquid fires.
3. **Maintain an adequate safeguard** on the site for a period of thirty (30) minutes following the cessation of welding or burning operations, including but not limited to after completion of work at end of shift, lunch breaks and temporary work.
4. **Where temporary water outlets** are available, provide hoses of sufficient length to reach construction areas. Hang hoses with a warning sign, to the effect that hoses are for fire protection purposes and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

5. **At the earliest feasible date** in each area of the project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel at the site on how to use facilities which may not be self-explanatory.
6. **See Section 011401**, "Work Restrictions," for requirements for obtaining AOC approval and permits for use of open-flame or welding equipment.

2.3 TEMPORARY FACILITIES

A. **Field Offices and Sheds**: Provide a reasonably neat and uniform appearance in temporary construction and support facilities acceptable to the CO/COTR. For temporary offices, fabrication shops, storage sheds and similar construction, provide either standard prefabricated or mobile units or the equivalent job-built construction. Provide support facilities that can be maintained properly throughout their use at the project site.

1. **Provide fire-resistant construction** for offices, shops, and sheds located within the construction work area, or within 50 feet of building lines.
2. **Locate field offices**, storage and fabrication sheds and other support facilities for easy access to the Work within the allocated staging area so that facilities will not block required exits or firemen's access to the building.
3. **Except as otherwise indicated**, make the change-over from use of temporary services and facilities to use of permanent services and facilities at the earliest feasible date at each portion of the building, to minimize hazards and interferences with performance of the Work.
4. **Maintain field offices**, storage and fabrication sheds, temporary sanitary facilities, waste collection and disposal systems, and project identification and temporary signs until near final acceptance. Immediately prior to final acceptance, with the CO/COTR's approval, remove these facilities.

B. **Temporary office space** may be located within the existing building or in mobile units, at the Contractor's option. Coordinate location and access with the CO/COTR to avoid interference with work to be performed by others. Temporary office space for the CO/COTR's personnel is not required for this project.

1. **Field Offices**: For new facilities or for facilities in which existing Government field offices do not exist, provide temporary field offices of sufficient size to accommodate required office personnel and project meetings at the project site.

C. **Storage and Fabrication Sheds**: Install storage and fabrication sheds or trailers, properly sized, furnished and equipped, as required to accommodate the Work. Comply with applicable provisions specified elsewhere for distribution and use of temporary utilities.

D. **Temporary Enclosures**: At the earliest practical time provide temporary enclosure of materials, equipment, work in progress and completed portions of the Work to provide protection to the Work and employees from effects of exposure, foul weather, other construction operations, and similar activities on the site.

1. Provide temporary enclosures where temporary heat is needed and the permanent building enclosure is not yet completed, and there is no other adequate provision for containment of temporary heat. Coordinate enclosures with ventilation and material drying or curing requirements to avoid dangerous conditions and effects.

E. **Temporary Partitions:** Erect and maintain dust-proof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

1. Construct dust-proof partitions of not less than nominal 4-inch ((100-mm)) studs, 5/8-inch (16-mm) Type X gypsum wallboard with joints taped on occupied side, and ½-inch (13-mm) fire-retardant plywood on construction side.
2. Construct dust-proof, floor-to-ceiling partitions of not less than nominal 4-inch ((100-mm)) studs, 2 layers of 6-mil (0.14-mm) polyethylene sheets, inside and outside temporary enclosure. Cover floor with 2 layers of 6-mil (0.14-mm) polyethylene sheets, extending sheets 18 inches (460 mm) up the side walls. Overlap and tape full length of joints. Cover floor with 3/4-inch (19-mm) fire-retardant plywood.

   a. *Construct a vestibule and airlock* at each entrance to temporary enclosure with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.

3. Insulate partitions to provide noise protection to occupied areas.
4. Seal joints and perimeter. Equip partitions with dust-proof doors and security locks.
5. Protect air-handling equipment.
6. Weatherstrip openings.

F. **Construction Aids**: Design, construct, and maintain construction aids and miscellaneous general services and facilities as needed to accommodate performance of the work. Construction aids and miscellaneous general services and facilities include, but are not limited to the following:

1. **Provide temporary stairs** where ladders are not adequate for performance of work, and until permanent stairs are available. Cover finished permanent stairs which will be exposed to occupants' use, with a durable protective covering of plywood or similar material so that finishes will be undamaged at the time of acceptance.
2. **Provide scaffolds** as required for proper execution of the Work. Remove or relocate scaffolds promptly to avoid interference with other trades. Provide stairs for vertical circulation.
3. **Provide adequate guardrails and barriers** at perimeters of each level of construction as work progresses in accordance with OSHA requirements and in conformance with requirements of the Special Conditions.
4. **Provide adequate facilities** for hoisting materials and employees. Do not permit employees to ride hoists which comply only with requirements for hoisting materials. The Contractor is responsible for selection of type, size and number of facilities. Truck cranes and similar devices used for hoisting are considered as being "tools and equipment" and not temporary facilities.

5. **Chutes**: Do not permit free dropping of materials, rubbish or debris, but remove by use of material hoist and/or rubbish chute. Locations of all hoists and chutes are subject to approval by the Architect.

   a. Protect building from use of hoists and chutes to prevent damage, marring or staining of permanent work. Brace and guy securely and provide safety devices as required by code.

G. **Project Signage**: No signs, other than safety signs, may be erected on the site unless specifically indicated otherwise.

H. **Access Roads**: To the fullest extent possible, locate temporary roads and paving for storage areas and temporary parking, in the same locations as permanent facilities for similar uses. To incorporate temporary paving provisions, review significant modifications of permanent paving requirements with the Architect for acceptance of the proposed improvements.

   1. **Provide temporary traffic control** facilities at the juncture of temporary roads with public roads, including warning signs for public traffic and "STOP" signs for the access road entrance onto public roads. Comply with requirements and recommendations of local traffic authorities.

2.4 EQUIPMENT

A. **Fire Extinguishers:** Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. **HVAC Equipment:** Unless Government authorizes use of permanent HVAC system, obtain CO/COTR permission to utilize vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control. Use of liquid-propane or fuel-oil heaters are restricted to exterior or un-enclosed spaces only; do not use these devices within existing buildings within the Capitol Complex.

   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 testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   3. **Permanent HVAC System:** If Government authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 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.

3.2 TEMPORARY UTILITY INSTALLATION

A. **General:** Install temporary service or connect to existing service.

B. **Job Conditions**: Provide each temporary service and facility ready for use at each location when the service or facility is first needed to avoid delay in performance of the Work. Maintain, expand as required and modify temporary services and facilities as needed throughout the progress of the Work. Do not remove until services or facilities are no longer needed, or are replaced by the authorized use of completed permanent facilities.

C. **Telephone Service:** At each telephone, post a list of important telephone numbers.

1. Police and fire departments.
2. Ambulance service.
3. Contractor's home office.
4. Architect's office.
5. Engineers' offices.
6. Government's office.
7. Principal subcontractors' field and home offices.

D. **Tie-ins** to existing utilities (chilled water, steam, electric, etc.) within the building, shall be performed at a time convenient to the Government. For the purposes of bidding, such time shall be considered as between the hours of 10:00 PM and 6:00 AM. Any such work in or affecting occupied spaces shall not commence until approval has been obtained and all materials and resources are available to perform the work in one continuous operation, with minimum disturbance.

1. **Utilities:** Utilities on or adjacent to the site, including underground services, shall remain undisturbed and in operation. The Contractor shall notify utility companies, appropriate departments of the District of Columbia and the Architect of emergencies involving unforeseen interferences of existing utility installations with work under this contract immediately upon the occurrence or discovery thereof. He shall be diligent in making such arrangements with respect to his own work on the site, and in coordinating his own work as necessary to permit the utility companies or appropriate departments of the District of Columbia involved to make the required repairs or changes.

3.3 SUPPORT FACILITIES INSTALLATION

A. **General:** Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Government.

B. **Temporary Roads and Paved Areas:** Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated on Drawings.

1. Provide dust-control treatment that is non-polluting and non-tracking. Reapply treatment as required to minimize dust.

C. **Traffic Controls:** Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. **Construction Parking Control**: Parking space for personal vehicles is not available on the site. Obtain approval of Architect for parking of construction motor vehicles or other equipment on the site.

E. **Dewatering Facilities and Drains:** Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. **Project Identification and Temporary Signs:** Provide Project identification and other signs. Unauthorized signs are not permitted.

1. **Staging Plan**: The CO/COTR has indicated in plan where the Contractor can stage the construction. Submit a Staging Plan indicating specific locations of the superintendent's trailer, storage and loading of materials, traffic direction and control concept and signage, security perimeter for staging area, locations of informational construction signage, locations of temporary toilets and other temporary construction, emergency facilities and resources and any other construction facilities required.
2. **Construction Signage:** Provide temporary, directional signs for construction personnel and visitors. Obtain CO/COTR approval of any requests for revisions to existing vehicle or pedestrian traffic patterns. All signage systems shall be submitted to the CO/COTR for approval prior to installation. Maintain and touch-up signs so they are legible at all times.
3. **Traffic Control**: Submit a site plan and details for review and approval by the CO/COTR to diagrammatically indicate proposed measures for safely and efficiently controlling and re-routing traffic as necessary to enable construction work, deliveries, paving, testing operations and other activities. Indicate schedules of activities occurring hourly before, during and after the normal workday. At all times provide minimal disruption to the day-to-day activities occurring on the site and at adjacent locations.

G. **Collection and Disposal of Wastes**: Establish a system for daily collection and disposal of waste materials from construction areas and elsewhere on the site. Enforce requirements strictly. Do not hold collected materials at the site longer than 4 days during normal weather or 2 days when

the daily temperature is expected to rise above 80 deg. F (27 deg. C). Handle waste materials that are hazardous, dangerous, or unsanitary separately from other inert waste by containerizing appropriately. Dispose of waste material in a lawful manner.

1. Burying or burning of waste materials on the site will not be permitted.
2. Washing waste materials down sewers or into waterways will not be permitted.
3. Provide rodent proof containers located on each floor level of construction work, to encourage depositing of garbage and similar wastes by construction personnel.

H. **Lifts and Hoists:** Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. **Temporary Elevator Use**: The CO/COTR will designate elevators available for use of Contractor's personnel. Use of other than designated elevators will not be permitted.

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.

K. **Temporary Stairs:** Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

L. **Existing Stair Usage:** Use of Government's existing stairs will be permitted, as long as stairs are cleaned and maintained in a condition acceptable to Government. 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, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.

M. **Temporary Use of Permanent Stairs:** Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. **Environmental Protection:** Provide protection, operate temporary facilities, and conduct construction in ways and by methods that 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."

B. **Temporary Erosion and Sedimentation Control:** Comply with requirements specified in Division 31 Section "Site Clearing."

B. **Temporary Erosion and Sedimentation Control:** Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

1. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

C. **Stormwater Control:** Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. **Tree and Plant Protection:** Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

E. **Pest Control:** If directed in the task order, 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. Obtain extended warranty for Government. Perform control operations lawfully, using environmentally safe materials.

F. **Barricades and Fences:** Before construction operations begins, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates. Comply with recognized standards and code requirements for the erection of substantial, structurally adequate barricades where needed to prevent accidents and losses. Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the public, of the hazard being protected against. Provide lighting where appropriate and needed, including flashing red lights where appropriate. Obtain CO/COTR approval of proposed lighting.

1. **When excavation** or other substantial elements of the Work begin, install a general enclosure fence with suitable lockable entrance gates. Locate where indicated, or if not indicated, enclose substantially the entire site or portion thereof determined to be sufficient to accommodate the entire construction operation. Install in a manner that will prevent persons, dogs and similar animals from easily entering the site, except by way of the entrance gates when open.

a. *For Projects Located on the Capitol Complex:* Except as otherwise indicated, provide vision-proof plywood type fencing, 8-feet high, framed with four 2 x 4 rails, and with treated wood posts spaced not more than 8-feet apart. For fences and vision barriers, provide exterior type, minimum 3/8" thick plywood, primed and finish painted. For safety barriers, sidewalk bridges and similar direct-contact uses, provide minimum 5/8" thick exterior plywood, primed and finish painted. *Refer to AOC details at the end of this Section.*

1) Construct standard, gate, and sign panels with decorative trim, as shown in details A, B, D, and G.

b. *For Projects Located Off Of the Capitol Complex:* Except as otherwise indicated, provide open-mesh, chain-link fencing with posts set in a compacted mixture of gravel and earth. Provide No.11-gage galvanized chain link fabric fencing 8 feet high and galvanized steel pipe posts, 1-1/2" I.D. for line posts, and 2-1/2" I.D. for corner posts.

2. **"Movable" Fences:** Obtain AOC approval for all "movable" fences and barricades subject to frequent relocation (daily installations), and approval for all methods of anchoring and securing such fences and barricades.

G. **Security Enclosure and Lockup**: Install substantial and durable general temporary enclosure of partially completed areas of construction. Provide locking entrances adequate to prevent unauthorized entrance, vandalism, theft and similar deleterious effects and violations of project security. Provide copies of access keys to the United States Capitol Police.

H. **Barricades, Warning Signs, and Lights:** Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

I. **Sidewalk Bridge and Walkway**: Erect a substantial, structurally adequate protective bridge for the passage of persons along the walkway wherever the possibility exists that materials might be hoisted from the roadway, across walkway and onto site. Coordinate with project entrance gates and other facilities and obstructions. Comply with governing regulations and requests of governing authorities.

1. **Construct the sidewalk bridge** using heavy scaffold or shoring type framing, waterproofed heavy wood plan-K overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well-drained walkways and similar provisions for protection and safe passage. Paint and maintain the facility in a manner acceptable to the Government.
2. **Construct the back wall** to serve as the project enclosure fence. Extend the framed plywood backwall beyond the bridge structure, as needed, to complete the enclosure fence.

J. **Temporary Enclosures**: At the earliest practical time provide temporary enclosure of materials, equipment, work in progress and completed portions of the Work to provide protection to the Work and employees from effects of exposure, foul weather, other construction operations, and similar activities on the site.

1. **Provide temporary enclosures** where temporary heat is needed and the permanent building enclosure is not yet completed, and there is no other adequate provision for containment of temporary heat. Coordinate enclosures with ventilation and material drying or curing requirements to avoid dangerous conditions and effects.

K. **Temporary Partitions:** Erect and maintain dust-proof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

a. *Construct dust-proof partitions* of not less than nominal 4-inch (100-mm) studs, 5/8-inch (16-mm) Type X gypsum wallboard with joints taped on occupied side, and ½-inch (13-mm) fire-retardant plywood on construction side.

b. *Construct dust-proof*, floor-to-ceiling partitions of not less than nominal 4-inch (100-mm) studs, 2 layers of 6-mil (0.14-mm) polyethylene sheets, inside and outside temporary enclosure. Cover floor with 2 layers of 6-mil ((0.14-mm)) polyethylene sheets, extending sheets 18 inches ((460 mm)) up the side walls. Overlap and tape full length of joints. Cover floor with 3/4-inch (19-mm) fire-retardant plywood.

1) *Construct* a vestibule and airlock at each entrance to temporary enclosure with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.

c. *Insulate partitions* to provide noise protection to occupied areas.

d. *Seal joints and perimeter*. Equip partitions with dust-proof doors and security locks.

e. *Protect* air-handling equipment.

f. *Weatherstrip* openings.

M. **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.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. **Supervision:** Limit availability of temporary services and facilities to essential and intended uses to minimize waste and abuse. Do not permit temporary installations to be abused or endangered. Do not allow hazardous, dangerous or unsanitary conditions to develop or persist on the project site.

B. **Installation:** Use qualified tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with the performance of the Work.

C. **Maintenance**: Operate and maintain temporary services and facilities in good operating condition throughout the time of use and until removal is authorized. Protect from damage by freezing temperatures and similar elements.

1. **Prevent water filled piping from freezing** by use of ground covers, insulation, by keeping drained or by temporary heating. Maintain distinct markers for underground lines. Protect from damage during excavation operations. Prevent contamination of water sources.

D. **Temporary Facility Changeover:** Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

E. **Termination and Removal**: Unless the CO/COTR requests that it be maintained for a longer period of time, remove each temporary service and facility promptly when the need for it or a substantial portion of it has ended, or when it has been replaced by the authorized use of a permanent facility, or no later than substantial completion. Repair damaged work, clean exposed surfaces and replace work which cannot be satisfactorily repaired. Contract time includes the time required for final cleanup of premises.

1. **Remove temporary roads** and paving materials which are not intended for or acceptable for integration into permanent paving. Where the area shown is intended for landscape development, remove soil and aggregate fill that does not comply with requirements for fill or subsoil in the landscape area. Remove materials contaminated with road oil, asphalt and other petro-chemical compounds, and other substances which might impair growth of plant materials or lawns. Repair or replace street paving, curbs and sidewalks at the temporary entrances, as required by the governing authority.
2. **Immediately prior to final acceptance**, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period.
3. **Restoration of Site and Adjacent Areas** : Restore the site and the adjacent areas used for staging, traffic, protection and storage of materials to their conditions prior to start of work. This includes, but is not limited to all site improvements, signage, lighting, street furniture, paving, sprinkler systems, utilities, plant, trees and turf materials. Procedures which may be required include de-compaction of compacted soils, addition of soil amendments, aeration, re-grading and removal of contaminated materials or other procedures as may be necessary.

END OF SECTION 015001

SECTION 015460 - SAFETY AND HEALTH

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. **General:** This section, general in nature, is applicable to all work performed under this contract and identifies some of the precautions necessary to protect the safety and health of employees, visitors, occupants and contract employees, and to prevent the loss of or damage to property and the environment.

1. Note the Construction Contractor submittal requirements outlined in Part 1 paragraph "Submittals" of this Section.

B. **Related Work:** The following sections, located elsewhere in this Project Manual, indicate the scope of work and specific measures to control hazardous materials/conditions:

1. Division 02/13 Sections "Asbestos Abatement Procedures"
2. Division 02/13 Sections "Lead Abatement Procedures"
3. Division 02/13 Sections "Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury"

1.2 REFERENCES:

A. **General:** The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Exclusion of any specific regulations/standards required by Federal and/or local codes does not relieve the Contractor of their legal and contractual obligations to adhere to such requirements.

B. **National Standards / Code of Federal Regulations (CFRs):**

1. 29 CFR 1910 - OSHA Occupational Safety and Health Standards.
2. 29 CFR 1926 - OSHA Safety and Health Regulations for Construction.
3. 40 CFR Parts 700-799, Subchapter R - Toxic Substance Control Act (TSCA).
4. 40 CFR Parts 50-99, Air Programs.
5. 40 CFR Parts 260-299, Hazardous Waste Management System (radionuclides).
6. 40 CFR Part 761 - Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.
7. 40 CFR Parts 104-140 and 401-471, Water Programs.
8. DOT Manual of Uniform Traffic Control Devices.
8. Americans with Disabilities Act (ADA), current with updates.

C. **Related Building and System Codes:**

1. International Building Code (IBC), 2003.
2. International Existing Building Code (IEBC), 2003.
3. National Fire Code - NFPA 101, 2003.
4. International Electrical Code, 2003; and related NEMA, NECA, and UL Standards.
5. International Mechanical Code, 2003.
6. International Plumbing Code, 2003.

D. **Federal Standard 313A - Material Safety Data Sheets, Preparation and Submission.**

E. **Related** District of Columbia, state, and local regulations shall apply.

1.3 **DEFINITION OF HAZARDOUS MATERIALS:**

A. **General:** Refer to hazardous and toxic materials/substances, Subparts H and Z of 29 CFR 1910 and related parts of 29 CFR 1926; 40 CFR 261; and to others as defined in Federal Standard 313.

B. **Those hazardous materials** most commonly encountered can include pesticides, cleaning agents, paints, adhesives, strippers, solvents, asbestos, polychlorinated biphenyls (PCB's), mercury vapor lamps, but may include others. Any unlabeled substance should be handled as hazardous material until properly identified.

C. **All suspect asbestos containing materials** (e.g., boiler insulation, duct insulation, pipe insulation), surfacing materials (i.e., plaster and sprayed-on fireproofing) and miscellaneous materials (i.e., asphalt flooring, ceiling tiles, adhesives and mastics, drywall, roofing, gaskets and cement board), must be considered asbestos containing unless proven otherwise in accordance with 29 CFR 1926.1101.

D. **Pre-1978 Surfaces:** All finished/painted surfaces of buildings constructed prior to 1978 shall be considered finished with lead based paint unless proven otherwise.

E. **Products likely to contain PCB's** include electrical transformers, capacitors, voltage regulators, oil switches, and some fluorescent light ballasts. Transformer vaults with PCB contaminated floors are identified by signage at the entry door (refer to Part 3 of this Section, article “Cautionary Procedures at Existing Vaults”).

F. **Products likely to include mercury** include fluorescent light tubes, switches, gauges, thermostats, and older thermometers.

1.4 **QUALITY ASSURANCE:**

A. **Pre-Construction Safety Meeting:** Representatives of the Contractor must meet with the Contracting Officer and his/her representative(s) prior to the start of work under this Task Order. The purpose of the pre-construction meeting is to review the Contractor's Safety and Health Program and Policies, and to discuss the implementation of all safety and health provisions pertinent to the work to be performed under the contract. The Contractor shall be

prepared to discuss, in detail, the measures he/she intends to take in controlling any unsafe or unhealthy conditions associated with the work to be performed under the contract. If directed by the Contracting Officer, this meeting may be held in conjunction with other pre-construction meetings such as the General Pre-Construction meeting. The level of detail of the safety meeting is dependent upon the nature of the work and the potential inherent hazards. The Contractor's principal on-site representative(s), the general superintendent and his/her safety representative(s) shall be in attendance.

B. **Compliance With Regulations:** All work, including contact with the handling of hazardous or regulated materials, the disturbance or dismantling of structures containing hazardous or regulated materials, and/or the transport and disposal of hazardous or regulated materials shall comply with the applicable requirements of 29 CFR 1910/1926, 40 CFR, 49 CFR, and all other applicable federal, state, and local regulations.

C. **Construction Site Lighting:** Lighting intensity levels for construction areas shall meet the minimum requirements established by 29 CFR 1926.56: Illumination, including *Table D-3 - Minimum Illumination Intensities in Foot-Candles*.

D. **Compliance/Conflicts:** All work shall comply with applicable Federal, state and local safety and health requirements. Where there is a conflict between applicable regulations, the most stringent shall take precedence.

E. **Contractor Responsibility:** All Contractors shall assume full responsibility and liability for compliance with applicable regulations pertaining to the health and safety of personnel during the execution of work, and shall hold the Government harmless for any action on his/her part, or that of his/her employees or subcontractors, which results in illness, injury or death. The Contractor shall designate a single point-of-contact who is authorized to act on behalf of the contracting firm, authorized to take immediate corrective actions, and assigned the task of daily inspections and reporting outlined herein. Construction Contractors shall comply with the following additional requirements in accordance with 29 CFR 1926.16 (Prime/Subs):

1. Compliance with the accepted Accident Prevention Plan written by the prime Contractor for the specific work, submitted to the government, and reviewed by the COTR. The Contractor's plan will be job specific and will include work to be performed by the subcontractors, and measures to be taken by the Contractor to control hazards associated with materials, services, or equipment provided by suppliers.
2. Regularly scheduled safety meetings shall be held at least once a week for all supervisors on the project to review past activities, to plan ahead for new or changed operations, and to establish safe working procedures for the anticipated hazards. An outline of each meeting shall be submitted through the COTR to the Contracting Officer.
3. At least one "toolbox" safety meeting shall be conducted weekly by field supervisors or foreman for all workers. An outline report of the meeting, including date, time, duration, attendance, subjects discussed and the name of the director shall be maintained and copies furnished to the designated authority on request.

1.5 **SUBMITTALS:**

A. **Submittal "Punch-List:"** A submittal punch list for projects involving "other" hazardous materials as identified in the Construction Contractor's Safety and Health Program and Policies (paragraph B, below) and/or other recognized flammable or toxic products identified in the referenced codes/standards.

B. **Contractor's Safety and Health Program and Policies:** Submit a Plan of Action for handling hazardous materials (except for asbestos, lead based paint, PCBs and mercury lamps as they are covered by specific sections) and/or flammable or toxic products. Work shall not commence until the Contractor's safety program has been reviewed by the Architect. The Construction Contractor's Plan of Action shall contain the following:

1. Activity Hazard Analysis and Accident Prevention Plan: Identification of anticipated hazards, problems, and proposed mitigation measures/mechanisms.
2. Description of how applicable safety and health regulations and standards are to be met.
3. Protection of the public or others not related to the operation. Maintain code-compliant means of egress for project duration.
4. Means of protection for adjacent non-construction areas, permanent and temporary access ways, and occupants and for controlling noise/dust/fumes/debris generated by the work.
5. Contractor Safety Officer: Identify a lead Safety Officer and alternates, including 24-hour contact information for each.
6. Specialized training and experience of employees to be used for the work.
7. Type of protective equipment and work procedures to be used.
8. Material Safety Data Sheets (MSDSs) for, and proposed procedures for using, disposing of, or storing toxic/hazardous materials (also see 29 CFR1910.1200). All management and disposal of wastes shall be in accordance with Federal, states and local regulations.
9. Phasing requirements to minimize impact to non-construction work activities.
10. Emergency procedures for handling accidental spills, releases or potential exposures.
11. Interfacing of trades and control of subcontractors, if applicable.
12. Identification of any required analyses, test demonstrations, and validation requirements.
13. Hazard Communications Plan.
14. Trenching and Shoring Plan.
15. Confined Spaces employee certifications and related work procedures.
16. Multi-Employer Worksite Plan.
17. Demolition plans outlining protective measures and responsibilities required under 29 CFR 1926, Subpart T.

C. **Accident Reporting:** Serious accidents such as those resulting in: treatment of an injury at a medical facility; response by emergency medical personnel; or damage to property other than that of the Contractor will be reported to the contracting officer's representative by telephone within twenty-four hours of the occurrence. A copy of each accident report, which the Contractor or subcontractors submit to their insurance carriers, shall be forwarded through the Contracting Officer's Technical Representative (COTR) to the Contracting Officer (CO) as soon as possible (in no event later than seven (7) calendar days after the occurrence). All

accidents/losses shall be reported using AOC "Incident Investigation Report" (from AOC Safety Policy 9-4, available from the COTR) or other form that meets OSHA Standards, as required. Any incident involving fatality or permanent total disability, or property damage to the Government or other property amounting to $100,000 or more requires immediate notification of the AOC Safety and Occupational Health Branch (SOHB).

D. **MSDSs:** The Contractor shall provide copies of each MSDS, in accordance with 29 CFR 1910.1200 - *App E* and with AOC 52.223-1. One copy shall be provided to the COTR per Division 1 submittal requirements, and a second copy shall be kept in an MSDS binder on the job site.

E. **Waste Disposal:** The Contractor shall dispose of all wastes and provide all paperwork, including but not limited to, manifests and disposal certifications, in accordance with all federal, state, and local regulations. Asbestos waste shall be accompanied by an Asbestos Shipment Record. The AOC shall sign manifests, certifications, and shipping records for lead, asbestos, and PCB wastes generated from this contract.

F. **Hot Work Permits:** When coordinating with the AOC's jurisdiction Superintendent for hot work, submit AOC designated "Hot Work Permit" (from AOC Safety Policy 10-14, available from the COTR) or other form that meets OSHA Standards, as required.

G. **Worker Certifications:** The Contractor shall provide copies of all worker certifications for handling Hazardous Materials, Working in Confined Spaces, and other certifications required by OSHA, EPA, and local regulatory agencies (not required by other technical sections in the Project Manual).

H. **Scaffolding:** All scaffolding that is erected on this job will be erected in accordance with the requirements of 29 CFR 1926, Subpart L -- *Scaffolds*. Per OSHA Standards, a scaffold erection plan will be developed by the Contractor, certified by an engineer (licensed in the District of Columba, Virginia, or Maryland) and provided to the CO prior to set up. Once in place, the Contractor's assigned safety officer shall inspect and document the conditions of the scaffold and scaffold anchor points prior to use, and once per shift thereafter. Any observed failures in the scaffold shall render it unusable until the condition is rectified and re-inspected. Weekly scaffold inspection reports shall be provided to the designated COTR for inclusion in the contract records.

1. **Other Means of Access:** Should the Contractor employ other means of access to the work area, they shall be utilized in accordance with the requirements of 29 CFR 1926, Subpart N -- *Cranes, Derricks, Hoists, Elevators, and Conveyors.* The Contractor shall submit a plan for use of such equipment, fully coordinated with any other plans for site facilities (i.e., scaffolding, staging, etc.).
2. **Scaffolding constructed** by the Contractor for use by AOC employees shall also comply with 29 CFR 1910.

PART 2 - PRODUCTS

2.1 **MATERIALS AND EQUIPMENT:**

A. **Special facilities**, devices, equipment, clothing, and similar items used by the Contractor in the execution of work shall comply with all applicable regulations. Such materials and equipment shall be identified in the Plan of Action called for herein.

2.2 **MATERIAL SAFETY DATA SHEETS (MSDSs):**

A. **MSDSs** shall be available on-site for all products used under this contract. The prime contractor is responsible for meeting the hazard communication requirements, in accordance with 29 CFR 1910.1200. To the extent feasible, non-flammable and non-toxic products shall be used.

PART 3 - EXECUTION

3.1 **CAUTIONARY PROCEDURES AT EXISTING VAULTS:**

A. **General:** Transformer vaults may have floors which are PCB contaminated. These vaults are generally marked by blue signs, which identify the vault as PCB-contaminated; assure all vaults are marked with blue signs prior to proceeding with Work. On rare occasions, vault doors in existing buildings may be equipped with protective alarms and devices. Consult the AOC COTR to ascertain whether vault doors in areas under this contract are so equipped and have proper approved signage systems.

3.2 **HAZARDOUS MATERIALS:**

A. **General:** The Contractor shall bring to the COTR's attention, any material suspected of being hazardous which he/she encounters during execution of the work. The COTR shall then determine whether the Contractor shall perform tests to determine the nature or toxicity of the material. If the COTR directs the Contractor to perform tests, and/or if the material is found to be hazardous and additional protective measures are needed, a change to the contract may be required (subject to the "AOC Official Procedure for Making Changes to Contracts"). Persons conducting sampling testing and laboratories processing samples shall be certified.

3.3 **CONFINED SPACES:**

A. **Confined Spaces:** It is the responsibility of the AOC to identify and demarcate all known confined spaces within our facilities. It is the Contractor's responsibility to notify and coordinate with the Superintendent's Office when confined space work is to be done, obtain permission from this office to enter the space, conduct all required testing of space prior to entry, and complete an entry permit as required by OSHA regulations and the Confined Space Program previously submitted to the AOC COTR for the project.

3.4 **PROTECTION:**

A. **Contractor Responsibility:** The Contractor shall take all necessary precautions to prevent injury to the public, building occupants and visitors, and damage to or contamination of property or the environment. For the purposes of this contract, the public or building occupants shall include all persons not employed by the Contractor or subcontractor thereof.

B. **Welding, Cutting, and Brazing:** The AOC specifically requires a permit for welding, cutting, and brazing. This AOC "Hot Work Permit" shall be approved each day by the AOC Superintendent's Safety Specialist, or his/her designee, and coordinated through the Superintendent's Office whenever welding, cutting or any open flame work is performed. Work areas shall be kept clear of combustibles within a 35-foot radius of any hot work. Combustibles which cannot be removed shall be covered with flame-resistant blankets. Compressed gas cylinders shall be secured in a vertical position and stored in accordance with Compressed Gas Association (GSA) Guidelines at all times. Valve protection caps shall be in place whenever cylinders are not in use, moved or stored. Appropriate fire extinguishers shall be maintained at welding and cutting operations. A designated fire watch shall sign and return the permit. The fire watch shall be on duty during operations and for a minimum of 30 minutes after completion of welding or cutting operations to ensure no possibility of fire exists.

1. Provide adequate ventilation to protect employees from fume or gas exposure.
2. During arc welding activities erect screens to shield activities.

C. **Storage:** It is prohibited to store, position, or use equipment, tools, materials, scraps, and trash in a manner likely to present a hazard to the public or building occupants by its accidental shifting, ignition, or other hazardous qualities. Storing of combustible or flammable liquids shall be in accordance with the current edition of the National Fire Code for Flammable and Combustible Materials (NFPA 30). Compressed gases shall be stored in accordance with Compressed Gas Association (CGA) guidelines.

D. **Obstructions:** No corridor, aisle, stairway, door, or exit shall be obstructed or used in such a manner as to encroach upon routes of ingress or egress utilized by the public or building occupants, or to present an unsafe or unhealthy condition to the public or building occupants.

E. **Housekeeping:** Housekeeping practices shall be in conformance with OSHA 29 CFR 1910.22, 29 CFR 1910.141, 29 CFR 1910.1001, 29 CFR 1910.1025, 29 CFR 1926.25, 29 CFR 1926.62, and 29 CFR 1926.1101, for non-construction and construction contracts respectively.

F. **Protection of the Public and Federal Employees:** Work shall not be performed in any area occupied by the public or Federal employees unless the Contractor takes adequate steps for the protection of the public and Federal employees, and work is specifically permitted by the contract/COTR/jurisdiction Superintendent. Comply with requirements of ANSI A10.34.2001.

G. **Electrical Systems:** In addition to complying with the referenced standards in this Section, refer to Division 1 requirements for "Temporary Facilities and Controls." Provide compliant electrical supply, overload/ground fault protection, lighting, and signage/notification systems.

Ensure that arrangements and installations accommodate the Architect's lockout/tagout procedures.

H. **Mechanical Systems:** Mechanical systems and equipment, and the components thereof, will be arranged and installed to provide ready accessibility and ease of lock/tag application during lockout/tagout procedures for AOC employees, post construction.

I. **Fences & Barricades:** The work area shall be fenced, barricaded, or otherwise segregated from the public or building occupants to prevent unauthorized entry into the work area. Fence elements shall be installed in such a manner as to overcome the negative or hazardous effects of wind and weather typical to the region. The use of barbed wire is prohibited unless requested in writing by the Architect.

J. **Pedestrian Access Ways:** All interior and exterior paths of travel established for pedestrian circulation within and around a construction site shall meet the requirements of 28 CFR Part 36 (*ADAAG*), Appendix A (Standards for Accessible Design), Articles 4.3 through 4.5; when a path is changed to accommodate work, the Contractor shall also provide directional signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), 2003. All paths shall be maintained clear and level, without obstruction. Any proposed exceptions to these requirement must be approved in writing by the Architect prior to construction.

1. **Lighting:** All interior/exterior access ways, both permanent and temporary, shall be provided with a uniform minimum lighting level of 3 footcandles (fc) at the walking surface, in accordance with 29 CFR 1926.56(a), Table D-3 - *Minimum Illumination Intensities in Foot-Candles*.

K. **Alternate Precautions:** When the nature of the work prevents isolation of the work area and the public or building occupants may be in or pass through, under or over the work area, alternate precautions such as the posting of signs, warning lights, the use of signal persons, the erection of barricades or similar controls around particularly hazardous operations shall be approved and used.

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

M. **Temporary Construction Barriers:** Temporary construction barriers, partitions which cover a hole in a rated fire wall, protect occupants from noise or vibration, or separate the construction from public access and exit corridors shall be erected floor-to-ceiling, wall-to-wall, and shall remain in place for the duration of the contract. The minimum construction standards for these temporary barriers shall be metal studs, anchored top and bottom at a maximum spacing of 16 inches (406 mm) on-center, and covered with a minimum of one layer of ½-inch gypsum wallboard.

N. **Dust and Fume Control Measures:** Work performed adjacent to occupied areas shall be done within dust control barriers (generally constructed of polyethylene sheeting or other barriers as approved by the Architect). To the extent feasible, maintain the work environment at a negative pressure differential with the adjoining occupied areas. The use of fume and odor producing products and materials shall be done in such a manner, or at such a time as to minimize impact on building occupants. Provide measures to minimize migration of dust, fumes, gases, and similar affects into the adjacent areas. Ensure that adequate ventilation is provided to work areas in conformance with OSHA regulations.

O. **Roof Work:** During the performance of roofing work, employees will be protected as required by the OSHA standards contained in 29 CFR 1926 - subpart M "Fall Protection."

P. **Removal of Fences and Barricades:** Fences and barricades shall be removed upon completion of the project, in accordance with local ordinance and to the satisfaction of the Contracting Officer or his/her representative(s).

Q. **Completion of Work:** Do not create or leave hazards unabated (e.g., open or absent electrical panels, unmarked circuit breakers/fuses, faceplates missing from receptacles, open maholes, un-barricaded trenches/excavations, etc.).

END OF SECTION 015460

SECTION 016001 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. **Related Sections** include the following:

1. Division 01 Section "Alternates" for products selected under an alternate.
2. Division 01 Section "References" for applicable industry standards for products specified.
3. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
4. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. **Products:** Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. **Named Products:** Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. **New Products:** Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
3. **Comparable Product:** Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. **Substitutions:** Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. **Basis-of-Design Product Specification:** Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities (salient characteristics) related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

A. **Product List:** Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. **Coordinate product list** with Contractor's Construction Schedule and the Submittals Schedule.
2. **Form:** Tabulate information for each product under the following column headings:

   a. Specification Section number and title.
   b. Generic name used in the Contract Documents.
   c. Proprietary name, model number, and similar designations.
   d. Manufacturer's name and address.
   e. Supplier's name and address.
   f. Installer's name and address.
   g. Projected delivery date or time span of delivery period.
   h. Identification of items that require early submittal approval for scheduled delivery date.

3. **Initial Submittal:** Within 15 days after date of commencement of the Work, submit 3 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.

   a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.

4. **Completed List:** Within 30 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
5. **AOC's Action:** The AOC will respond in writing to Contractor within 15 days of receipt of completed product list. The AOC's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. The AOC's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. **Substitution Requests:** Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. **Substitution Request Form:** Use CSI Form 13.1A or similar form as approved by the CO/COTR.
2. **Documentation:** Show compliance with requirements for substitutions and the following, as applicable:

   a. *Statement* indicating why specified material or product cannot be provided.
   b. *Coordination information*, including a list of changes or modifications needed to other parts of the Work and to construction performed by the AOC and separate contractors, that will be necessary to accommodate proposed substitution.
   c. *Detailed comparison* of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
   d. *Product Data*, including drawings and descriptions of products and fabrication and installation procedures.
   e. *Samples*, where applicable or requested.
   f. *List of similar installations* for completed projects with project names and addresses and names and addresses of architects and owners.
   g. *Material test reports* from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
   h. *Research/evaluation reports* evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
   i. *Detailed comparison* of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
   j. *Cost information*, including a proposal of change, if any, in the Contract Sum.
   k. *Contractor's certification* that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
   l. *Contractor's waiver of rights* to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. **AOC's Action:** If necessary, the AOC will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. The AOC will notify of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

   a. *Form of Acceptance:* Change Order.

b. *Use product specified* if the AOC cannot make a decision on use of a proposed substitution within time allocated.

4. **Comparable Product Requests:** Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

a. *AOC's Action:* If necessary, the AOC will request additional information or documentation for evaluation within one week of receipt of a comparable product request. The AOC will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
b. *Form of Approval:* As specified in Division 01 Section "Submittal Procedures."
c. *Use product specified* if the AOC cannot make a decision on use of a comparable product request within time allocated.

C. **Basis-of-Design Product Specification Submittal:** Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. **Compatibility of Options:** If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. **Each contractor** is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. **If a dispute arises** between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. **Deliver, store, and handle products** using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. **Delivery and Handling:** Schedule delivery to minimize long-term storage at Project site and to prevent over-crowding of construction spaces.

1. **Coordinate delivery** with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
2. **Deliver products** to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
3. **Inspect products** on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. **Storage:**

1. **Store products** to allow for inspection and measurement of quantity or counting of units.
2. **Store materials** in a manner that will not endanger Project structure.
3. **Store products** that are subject to damage by the elements, under cover in a weather-tight enclosure above ground, with ventilation adequate to prevent condensation.
4. **Store cementitious** products and materials on elevated platforms.
5. **Store foam plastic** from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. **Comply** with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. **Protect stored products** from damage and liquids from freezing.
8. **Provide** a secure location and enclosure at Project site for storage of materials and equipment by AOC's construction forces. Coordinate location with AOC.

1.7 PRODUCT WARRANTIES

A. **Warranties specified** in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. **Manufacturer's Warranty:** Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to AOC.
2. **Special Warranty:** Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for AOC.

B. **Special Warranties:** Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. **Manufacturer's Standard Form:** Modified to include Project-specific information and properly executed.
2. **Specified Form:** When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. **Refer to** Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.

C. **Submittal Time:** Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. **General Product Requirements:** Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. **Provide products** complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. **Standard Products:** If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. **The Government** reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. **Where products** are accompanied by the term "as selected," the AOC will make selection.
5. **Where products** are accompanied by the term "match sample," sample to be matched is AOC's.
6. **Descriptive**, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. **Or Equal:** Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. **Product Selection Procedures:**

1. **Products:** Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
2. **Available Products:** Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
3. **Product Options:** Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
4. **Basis-of-Design Product:** Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
5. **Visual Matching Specification:** Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

a. *If no product available* within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

6. **Visual Selection Specification:** Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

a. *Standard Range:* Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, the AOC will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
b. *Full Range:* Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, the AOC will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. **Timing:** AOC will consider requests for substitution if received within 15 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of AOC.

B. **Conditions:** The AOC will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, AOC will return requests without action, except to record noncompliance with these requirements:

1. **Requested substitution** offers AOC a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities AOC must assume. AOC's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. **Requested substitution** does not require extensive revisions to the Contract Documents.
3. **Requested substitution** is consistent with the Contract Documents and will produce indicated results.
4. **Substitution request** is fully documented and properly submitted.
5. **Requested substitution** will not adversely affect Contractor's Construction Schedule.
6. **Requested substitution** has received necessary approvals of authorities having jurisdiction.
7. **Requested substitution** is compatible with other portions of the Work.
8. **Requested substitution** has been coordinated with other portions of the Work.
9. **Requested substitution** provides specified warranty.
10. **If requested substitution** involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

A. **Conditions:** The AOC will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, AOC will return requests without action, except to record noncompliance with these requirements:

1. **Evidence** that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. **Detailed comparison** of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. **Evidence** that proposed product provides specified warranty.
4. **List of similar installations** for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. **Samples,** if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016001

SECTION 017301 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Government-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.
9. Related Sections include the following:

B. **Division 01 Section** "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.

C. **Division 01 Section** "Submittal Procedures" for submitting surveys.

D. **Division 01 Section** "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.

E. **Division 01 Section** "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of AOC-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

A. **Certificates:** Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

B. **Landfill Receipts:** Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

C. **Certified Surveys:** As required by the Task Order, submit two copies signed by land surveyor.

D. **Final Property Survey:** As required by the Task Order, submit 5 copies showing the Work performed and record survey data.

1.4 **QUALITY ASSURANCE**

A. **Land Surveyor Qualifications:** A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 **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. **Existing Utilities:** The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify with proper authorities the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. **Acceptance of Conditions:** Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. **Written Report:** Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

a. Description of the Work.
b. List of detrimental conditions, including substrates.
c. List of unacceptable installation tolerances.
d. Recommended corrections.

2. **Verify compatibility** with and suitability of substrates, including compatibility with existing finishes or primers.
3. **Examine roughing-in** for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. **Examine walls**, floors, and roofs for suitable conditions where products and systems are to be installed.
5. **Proceed** with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. **Existing Utility Information:** Furnish information to the AOC 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.

B. **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.

C. **Space Requirements:** Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. **Review of Contract Documents and Field Conditions:** Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation" or similar form as approved by the CO/COTR.

3.3 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 AOC promptly.

B. **General:** As required by the Task Order, engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.

5. Notify AOC when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. **Site Improvements:** Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. **Building Lines and Levels:** Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. **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 AOC.

3.4 FIELD ENGINEERING

A. **Identification:** Owner will identify existing benchmarks, control points, and property corners.

B. **Reference Points:** Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of AOC. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to AOC before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. **Benchmarks:** Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. **Certified Survey:** On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. **Final Property Survey:** As required by the Task Order, prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. **Show boundary lines**, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. **Recording:** At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 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.
4. Maintain minimum headroom clearance of 8 feet (2.4 m) in spaces without a suspended ceiling.

B. **Comply** with manufacturer's written instructions and recommendations for installing products in applications indicated.

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

F. **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.

G. **Anchors and Fasteners:** Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. **Mounting Heights:** Where mounting heights are not indicated, 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.

H. **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.

I. **Hazardous Materials:** Use products, cleaners, and installation materials that are not considered hazardous.

3.6 AOC-INSTALLED PRODUCTS

A. **Site Access:** Provide access to Project site for AOC's construction forces.

B. **Coordination:** Coordinate construction and operations of the Work with work performed by AOC's construction forces.

C. **Construction Schedule:** Inform AOC of Contractor's preferred construction schedule for AOC's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify AOC if changes to schedule are required due to differences in actual construction progress.

D. **Pre-installation Conferences:** Include AOC's construction forces at pre-installation conferences covering portions of the Work that are to receive AOC's work. Attend pre-installation conferences conducted by AOC's construction forces if portions of the Work depend on AOC's construction.

3.7 PROGRESS CLEANING

A. **General:** Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 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.

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 promptly.
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:** Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

1. **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.
2. **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.

H. **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.

3.8 STARTING AND ADJUSTING

A. **Start equipment** and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. **Adjust operating components** for proper operation without binding. Adjust equipment for proper operation.

C. **Test each piece of equipment** to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. **Manufacturer's Field Service:** If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.9 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.

3.10 **CORRECTION OF THE WORK**

A. **Repair or remove** and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

B. **Repairing includes replacing defective parts**, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

C. **Restore permanent facilities** used during construction to their specified condition.

D. **Remove and replace** damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

E. **Repair components** that do not operate properly. Remove and replace operating components that cannot be repaired.

F. **Remove and replace** chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017301

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes procedural requirements for cutting and patching.

B. **Related Sections** include the following:

1. Divisions 2 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 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 surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. **Cutting and Patching Proposal:** Submit a proposal describing procedures at least 5 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. **Extent:** Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. **Changes to In-Place Construction:** Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. **Products:** List products to be used and firms or entities that will perform the Work.
4. **Dates:** Indicate when cutting and patching will be performed.
5. **Utility Services and Mechanical/Electrical Systems:** List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.

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. **AOC'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.

1.5 QUALITY ASSURANCE

A. **Structural Elements:** Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. **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. Operating elements include the following:

1. Air or smoke barriers.
2. Fire-suppression systems.
3. Mechanical systems piping and ducts.
4. Control systems.
5. Communication systems.
6. Electrical wiring systems.
7. Operating systems of special construction in Division 13 Sections.

C. **Miscellaneous Elements:** Do not cut and patch miscellaneous elements or related 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. Miscellaneous elements include the following:

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.
6 Noise- and vibration-control elements and systems.

D. **Visual Requirements:** Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed 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.

E. **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. Verify that appropriate utility location services have been performed and utilities properly located and identified.

1.6 **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

2.1 **MATERIALS**

A. **General:** Comply with requirements specified in other Sections.

B. **In-Place Materials:** Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 **EXAMINATION**

A. **Examine surfaces** to be cut and patched and conditions under which cutting and patching are to be performed. Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. **Temporary Support:** Provide temporary support of Work to be cut.

B. **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.

C. **Adjoining Areas:** Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. **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.

3.3 PERFORMANCE

A. **General:** Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay. 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. **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 as small as possible, neatly to 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.

C. **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 possible. Provide materials and comply with installation requirements specified in other Sections.

1. **Inspection:** Where feasible, test and inspect patched areas after completion to demonstrate 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 eliminate 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, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

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 weather-tight condition.

D. **Cleaning:** Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION 017701 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.
4. Record Documents.

B. **Related Sections include the following:**

1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
2. Division 01 Section "Execution" for progress cleaning of Project site.
3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
6. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. **Preliminary Procedures:** Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Government of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Obtain and submit releases permitting Government unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by AOC. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Government. Advise Government's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Government of changeover in heat and other utilities.
12. Submit changeover information related to Government's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touch-up painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. **Inspection:** Submit a written request for inspection for Substantial Completion. On receipt of request, the CO/COTR will either proceed with inspection or notify Contractor of unfulfilled requirements. CO/COTR 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 CO/COTR, 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.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. **Preliminary Procedures:** Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of CO/COTR's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by CO/COTR. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.

5. Instruct AOC's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. **Inspection:** Submit a written request for final inspection for acceptance. On receipt of request, CO/COTR will either proceed with inspection or notify Contractor of unfulfilled requirements. CO/COTR 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.

C. **Reinspection:** Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. **Preparation:** Submit three copies 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. Use CSI Form 14.1A or similar form as approved by the CO/COTR.

1. Organize list of spaces in sequential order.
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 or Designer of Record.
   d. Name of Contractor.
   e. Page number.

1.6 WARRANTIES

A. **Submittal Time:** Submit written warranties on request of CO/COTR for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. **Partial Occupancy:** Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by AOC during construction period by separate agreement with Contractor.

C. **Organize warranty documents** into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 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.

2.2 AS-BUILT RECORD DRAWINGS

A. **Description:** Following completion of field work, the Contractor shall transmit notations of field modifications to the original construction documents to the designer of record to facilitate revision of the original construction drawings to reflect “as-built” conditions. Provide one record drawing for each original construction drawing.

1. **Preparation Party:** Record drawings shall be prepared by the designer of record, working from data provided by the Contractor. Following completion of record drawing preparation the Contractor shall approve all “as-built” data incorporated into the record documents as being accurate representations of the project as constructed.
2. **Cover Sheet:** Amend the original construction drawing cover sheet to add the construction contractor’s name, address, telephone number, and name of point of contact for the as-built work.
3. **All Sheets:** All sheets shall have a “Record Drawing Stamp” (graphic symbol) placed for maximum visibility without conflicting with other pertinent data. Place the “stamp” on the layer Z-ANNO-REVS. The Record Drawing Stamp shall include text inserted on each drawing (whether altered or not) identifying each as: “Record Drawing,” and including the date of completion. To help ensure that no field modifications are missed, annotate the revision block on each sheet as follows:

   a. Drawing sheets with No Changes: “As-Built.”
   b. Drawing sheets with revisions to match final field conditions: “As-Built Conditions Shown.”

B. **CAD File Preparation:** Prepare record drawings from copies original construction drawings. Make all drawing changes in the same CAD format in which the original construction drawings were prepared (MicroStation is the AOC default software). Files shall be created using standard

CAD vector entities. The use of scanned or digitized files is not allowed. The use of files that have been vectorized from hand drawn, scanned, or digitized drawings are not allowed.

1. **Core CAD Standards:** Comply with the requirements of the *United States National CAD Standard*, published jointly by the National Institute of Building Sciences (NIBS), the American Institute of Architects (AIA), the Construction Specifications Institute (CSI), and as augmented by the AOC in the *AOC CAD User Manual, Part 7 - Levels.*

   a. ***Standards Version:*** CAD standards that applied at the time the design effort was initiated shall be required for the as-built modifications with the following exceptions:

      1) The revisions shall be performed on the layer that the object being changed was constructed on. A "cloud" will be drawn around the changed portion and will be placed on layer Z-ANNO-REVS. Revision symbols and notes, including those placed in the drawing's revision block, will be placed on the Z-ANNO-REVS layer.
      2) As-built documentation shall be inputed into copies of final construction document files that are free of reference file attachments and that graphically reflect final plot images.

   b. ***Format:*** Adhere to the same CAD format in which the original construction drawings were prepared.

      1) *Scale and Orientation:* Maintain the same "true scale" settings as the original construction drawings. Do not move or relocate original vector representations of building components unless required to represent as-built conditions.
      2) *Drawing Border and Title Block:* Retain the original construction drawings title blocks and edit to reflect record drawing status.
      3) *Sheet Sizes:* Record documents shall not alter sheet sizes from the original construction drawings.

2. **Drawing Content:** Record documents shall indicate, at a minimum, the following modifications:

   a. ***Architectural Drawings:***

      1) *Floor Plans:* Demolished items should be removed from the files and indication of new/existing eliminated.

         a) *Floor Presentation:* Irrespective of floor plate size, show each floor in a single file, on a single sheet. Construction document presentations can be developed using reference file attachments to provide for suitable sheet scales for bid documents.
         b) *Symbolic Representations:* Graphic representations follow standards set by AIA and NEC.

2) *Annotation Data:* Traditional identification of room names, numbers matching exactly what is indicated on actual entrances; area shapes inputted to Congressional space measurement rules; annotation of construction notes applicable after construction completion. As applicable, major building section cut symbols and match lines should be indicated.

   a) *Dimensions:* Utilize standard dimension levels but only annotate major building components - overall building lengths, wings, etc. Normal construction dimensions across rooms and spaces, etc. are not required within the system.
   b) *Room Numbers:* Utilize room numbers that exactly match the actual numbers that are used in the facility. In conformance with the AOC *Capitol Hill Graphics Manual*, include all hyphens delimiters, etc. in any numbering convention.
   c) *Room Names:* Use the customary title associated with each room or space. Never identify a room or space by Member or Justice name.

3) *Door & Opening Data:* Doors; door swings; door frames; and door numbers. Note that door numbers are a subset of the room number to which they belong (e.g., entry door to room 3120 would be 3120A). Note that each data element type is on a unique level.
4) *Equipment Levels:* Built-in equipment & associated maintenance clearances.

   a) *Restroom Equipment:* Indicate all vanities, built-in casework, and toilet and bath accessories (towel dispensers, built-in trash disposal units, etc.) and toilet partitions, doors, and grab bars.

5) *Floor Data:* Balcony hand & guardrails; built-in casework (with indication of overhead casework); ceiling references; stairs & railings; elevators and escalators; overhead soffits & ceiling references; plumbing fixtures; raised floors; shafts; and toilet partitions & handrails.
6) *Furniture Data:* Fixed furnishings such as rostrums, court benches, etc.
7) *Glazing:* Curtainwalls; curtainwall centerlines; windows & window sills; and window identification numbers within standard cells. Show window frames/mullions on window levels.
8) *Grids:* Structural grids; grid identification; and structural columns. Note that grids are included as "general" levels to allow shared use across all disciplines. (Grid "Tags" and associated "bubbles/leader lines" extend to 5 feet from building face, at that point structural grids continue through the building).
9) *Walls:* Cavity walls; exterior walls; interior walls; movable walls; partial-height walls; structural walls; wall fire ratings; and wall centerlines. Walls should be drawn to finish face. Wall categorization supports building modeling and multiple use of master files. In masonry/stone buildings, indicate interface between stone and backup masonry.

b. ***Civil/Site Drawings:***

1) *General:* The civil plans serve as the backgrounds for landscape and utility plans.

   a) *To Scale:* Representations of devices as they would appear in size and shape.
   b) *Notes:* General text information in drawing files to typically annotate only non-changing features.
   c) *Annotation:* Provide annotation integral to each system.
   d) *Symbology:* All symbology shall provide for ready interpretation from black and white reproduction/plotting. Use AOC standard cells wherever possible. Provide appropriate north arrows and graphic scales within every drawing frame. As practicable, orient each drawing with north "up."

2). *Paving:* Indicate paved parking areas, parking bumpers, space lining systems and numbering; roads and streets with gutters and curbs indicated; indicate cross-walks and traffic annotation as applied to paving surfaces;
3) *Piping Systems:* Locate underground piping and identification of domestic water, fire lines, fuel lines, natural gas, hot/cold water lines, sanitary sewer lines, steam lines, and storm lines. Provide for iconic representation of relative pipe size via AOC line weights. Show manholes and indicate extent of buried vaults.
4) *Power Systems:* Indicate both underground and above ground electric power lines and duct-banks.
5) *Property Lines:* Indicate property lines, bearings and distances, easements, etc.
6) *Site features:* Indicate fences; retaining walls; barriers; guard shacks; fixed seating; pools and fountains;
7) *Telecommunication:* Indicate both underground and above ground telecommunication lines and duct-banks; poles; and all associated guys wires and supports.
8) *Topographic Contours:* Indicate topographical contours at one foot intervals, varying line style and weight to indicate five foot intervals; identify each contour on a separate annotation level for one foot and for five intervals; show water runoff-flow arrows; use differing symbology to indicate new or revised grading that provides for clear identification in black and white reproduction.
10) *Traffic Systems:* Indicate traffic signals, signs, etc.

c. ***Electrical Drawings:***

1) *General:* Lighting and power plans are combined in a single file for AOC masters. Use the AOC Electrical Workspace to input power and lighting disciplines that utilize multi-level symbols to automatically facilitate 1/4 or 1/8 scale working and "As-Is" master plans.

a) *To Scale:* Representations of devices as they would appear in size and shape.

b) *Identifiers:* Text notations for control, special purpose, naming, rating, etc.

c) *Notes:* General text information in drawing files to denote non-typical conditions such as special heights, special use, etc. Notes are not to be confused with identifiers for circuits, home-runs, light fixtures, panels, junction boxes, switches or devices.

d) *Reference Files:* Attach the corresponding architectural master floor plan as the background, coincidentally mounted, set level symbology color to 250 and line weights to 0, and display levels for: exterior walls, structural interior walls, interior partitions, stairs, doors/door swings, windows, columns, plumbing fixtures/toilet partitions, casework, and presentation numbers.

2) *Lighting:*

a) *Lights:* To scale and symbolic representations of strip, incandescent, fluorescent; recessed, pendent mounted, surface mounted; emergency, exit, and special fixtures (floor mounted, halogen, etc) as well as identifiers with symbols for control and special use designations.

b) *Junction Boxes:* Iconic representations of junction and pull boxes (floor-mounted, wall-mounted, ceiling-mounted).

c) *Switches:* Iconic representations of keyed, low voltage, remote, 3-way, 4-way, single pole, timed, and dimmer. Identifiers used to show control of fixtures

d) *Panels:* To scale and symbolic representations of panel boxes, transformers, switchgear, emergency power, high voltage (277-480), low voltage (120-208) and associated identifiers for naming of units. Provide full panel schedules.

e) *Circuits:* Iconic representations of exposed, concealed, flexible conduits; raceways; wiring for receptacles, switches, devices, etc. Noted with conduit size, type and number of conductors. Identifiers for special uses such as emergency circuits.

f) *Homeruns:* Iconic representation designates panel that circuit is from, circuit numbers used, and number of circuits (number of arrows). Identifiers for special uses such as emergency circuits.

g) *Notes:* General information dealing with an item, such as non-typical mounting heights, or an area.

3) *Power:*

a) *Receptacles:* Iconic representations of; floor-mounted, wall-mounted or ceiling-mounted; single, duplex and quadruplex; split wired, special purpose and various amperage. Waterproof, GFI, emergency as well as identifiers noted with symbols.

b) *Junction Boxes:* Iconic representations of junction and pull boxes (floor-mounted, wall-mounted, ceiling-mounted).

c) *Switches:* Iconic representations of switches for control of devices, receptacles, etc. Identifiers for clarification of control as well as special function.

d) *Panels:* To scale and symbolic representations of panel boxes, transformers, switchgear, emergency power, high voltage (277-480), low voltage (120-208) and associated identifiers for naming of units. Provide full panel schedules.

e) *Circuits:* Iconic representations of trench/floor duct systems; cable trays; exposed, concealed, flexible conduits; raceways; wiring for receptacles, switches, devices, etc. Noted with conduit size, type and number of conductors. Identifiers for special uses such as emergency circuits.

f) *Homeruns:* Iconic representation designates panel that circuit is from, circuit numbers used, and number of circuits (number of arrows). Identifiers for special uses such as emergency circuits.

g) *Devices:* Iconic representations of legislative clocks, disconnects, motors, motor control units, buzzers, thermostats, etc. Identifiers for clarification of control as well as special function.

h) *Notes:* General information dealing with an item, such as non-typical mounting heights, or an area.

d. ***Mechanical Drawings:***

1) *General:* All mechanical plans shall be coincidentally attached over appropriate referenced AOC architectural floor plans. Work will be shown on an entire building floor plans, with partial floor plan information incorporated into the master product. For masters generated from existing, design documents or as-built documents, use contemporary symbology.

a) *To Scale:* Representations of ducts and devices as they would appear in size and shape.

b) *Identifiers:* Text notations for control, special purpose, naming, rating, etc.

c) *Notes:* General text information in drawing files to denote non-typical conditions such as special heights, special use, etc. Notes applicable to details and schedules, historic value, or listing capacities, etc. should be retained on the CAD master. Instructions for constructing the design should not be retained. Do not indicate demolition information.

d) *Reference Files:* Attach the corresponding architectural master floor plan as the background, coincidentally mounted, set level symbology color to 250 and line weights to 0, and display levels for: exterior walls, structural interior walls, interior partitions, stairs, windows, columns, plumbing fixtures/toilet partitions, casework, and presentation numbers. Do not display doors/door swings.

2) *Piping Systems:* On the same floor plan as other HVAC elements using AOC level schemes. Use proper symbology for piping (high/low pressure steam supply and condensate, hot water supply and return, chilled water supply and return, cooling coil condensate, etc.) See AOC A-E Design Standards for level schemes. Indicate relative pipe size by using AOC sidebar menus.

   a) *Terminals:* Radiators and fin-tube units using proper symbols.
   b) *Components:* As appropriate indicate associated mechanical equipment (coils, filters, sub-components of larger units, etc.).
   c) *Devices:* Indicate valves, test valves, spigots, drains, etc.

3) *Controls & Instrumentation:* Temperature and humidity sensors and thermostats - (Show both room and duct devices). Show symbolic pneumatic or wiring path to control device.
4) *HVAC Ductwork:* Sizes, duct materials and gage (if noted on existing plans). Sizes should appear on each duct segment. Show main trunks and all distribution lines.

   a) Duct lining and insulation - This information shall be input in Triforma MS.
   b) CFM quantities - Note at each termination. Also indicate directional flow arrow.
   c) Bottom of duct elevations (i.e., in database or notes) <u>if indicated on source drawings</u>.
   d) Cross-overs and indications of vertical runs (for legibility in 2-D reading). Dash ducts as they cross under higher ducts.
   e) Turning vanes - If shown on drawing, transfer to masters.
   f) Labels and notes - Shall be copied from existing drawings. Notes that reference other information, provide capacities, or have historic value, etc. should be retained on the CAD master. Instructions for constructing the design should not be retained. Do not indicate demolition information. Do not indicate existing, all work will be existing.

5) *Diffusers, Registers & Grilles:* Air devices, transitions, diffusers, registers, and grilles - Indicate air flow at each terminal device. Symbols to be SMACNA-compliant. Air handlers (fans, ventilators, filters, etc.), condensers, step-down units, etc.
6) *HVAC Equipment:* Transfer pertinent information for this equipment. Level of detail should be consistent, but may have to be adjusted based on the detail on the existing drawings. Information on capacities and components should not be omitted.

   a) All mixing boxes/VAV's, etc. - Build cell libraries as needed.
   b) Dampers - volume, automatic, and fire -
   c) Tags on all boxes, equip., etc. - Use typicals for notes where applicable. See AOC symbols for tag format.

d) Show all hoods and related exhaust ductwork.

7) *Schedules and Details:* Separate from floor plan, but shall be cross referenced (linked) to appropriate plans. If details are just larger scale representations of the floor plan, consider incorporating into the master floor plan (Judgment must be made on the complexity of the detail).

8) *Schematic Control Drawings:* Prepare using AOC symbology. Cell libraries and palettes available to support input.

e. ***Plumbing Drawings:***

1) *General:* This discipline utilizes AOC developed menus and symbols. AOC level schemas assume that all plumbing shown in the "As-Is" masters is existing.

a) *Notes:* General text information in drawing files to denote non-typical conditions such as special heights, special use, etc.
b) *Reference Files:* Attach the corresponding architectural master floor plan as the background, coincidentally mounted, set level symbology color to 250 and line weights to 0, and display levels for: exterior walls, structural interior walls, interior partitions, stairs, doors/door swings, windows, columns, plumbing fixtures/toilet partitions, casework, and presentation numbers.
c) *Annotation:* Provide sizing identification above each segment on annotation levels separate from the entity being annotated.

2) *Domestic, Drinking, Sanitary and Storm Piping:* Show piping runs, with iconic representations of fittings (elbows, tees, etc.) with line weight varied to represent relative pipe size. Do not show pipe size using actual scale except in detail enlargements. Indicate vent pipes with proper dashed symbology. Indicate vertical runs and all tie-ins. Do not break pipe "runs" at each intersected "tee" unless a directional change is required.
3) *Fixtures:* Display fixtures from architectural masters.
4) *Details:* To the extent possible, indicate equipment, fixtures, and associated piping to scale.

f. ***Structural Drawings:***

1) *General:* All foundation and framing plans shall be coincidentally attached over appropriate referenced AOC architectural plans. Work will be shown on an entire building floor plans, with partial floor plan information incorporated into the master product. In addition, indicate the date of the original design drawing from which the information was taken.

a) *Identifiers:* Text notations for member/section sizes, etc. Define material properties, design codes used, and design loads.

b) *Notes:* General text information in drawing files to denote non-typical conditions such as special heights, special use, etc. Notes applicable to details and schedules, historic value, or listing capacities, etc. should be retained on the CAD master. Instructions for constructing the design need not be retained. Do not retain demolition information that has no significance to existing conditions.

c) *Member Properties:* Because of the age of our buildings, include a table on each sheet that lists the section modulas, sizes, etc. for every member size used on the sheet. This supports analysis during emergencies when access to older steel handbooks may be difficult.

d) *Member Labeling:* To the extent practicable, label every member and avoid use of "DO" (ditto) annotations. This preserves content when cut-outs are extracted or referenced - especially for emergency use.

2) *Plans:* Use AOC level schemes and symbology as stated in the AOC A-E Design Standards. Structural elements - show sizes, foundations, structural framing, bracing, load bearing walls, soil properties, and other properties as shown on existing drawings.

a) *Beams & Joists:* Indicate using standard industry single line symbology. Show beams and joist on separate levels. Indicate girders with symbology that distinguishes them from beams.

b) *Columns & Bracing:* To the extent practicable, use actual section shapes from the AOC cells libraries or published libraries for steel columns. For concrete columns, draw to actual finished size.

c) *Stairs:* Show fronts of treads and all handrails.

d) *Gratings:* Use standard grating symbology. Grating indications may be graphic grouped but do not input using techniques that will restrict future "triming" or "puncturing."

e) *Joints:* Indicate all control and expansion joints.

f) *Cross-overs* and indications of vertical runs (for legibility in 2-D reading) - Dash as they cross under higher elements. Show symbols to indicate vertical elements.

g) *Labels and notes* - Shall be copied from existing drawings. Notes that reference other information, provide capacities, or have historic value, etc. should be retained on the CAD master. Instructions for constructing the design need not be retained. Demolition information need not be included, unless it provides significant to the existing conditions. Do not indicate existing, all work will be existing.

C. **Deliverables:** Provide the AOC with 2 copies of each of the following:

1. **Electronic Media:** Submit final record documents on CD-ROM. The CDs shall become property of the Architect of the Capitol. Files need not be compressed.

2. **Plotted Files:** Provide completed record drawings plotted at the same size as the original construction drawings to accompany the electronic deliverables.

D. **Transmission Media**: Arrangements should be made with the Technical Support Division early in the project to verify suitability of computer transmission media. Do not use multiple disks to transmit single files. The AOC can accept CAD deliverables in the following media:

1. 3-1/2" 1.44 MB floppy disks, CD-ROM disks, or 100 or 250 MB "ZIP" disks.
2. Use electronic file naming conventions specified in Part 5.

DO NOT TRANSMIT DRAWINGS OVER THE INTERNET OR MODEMS WITHOUT PERMISSION!

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. **General:** Provide 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 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. Remove snow and ice to provide safe access to building.
f. 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.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Replace parts subject to unusual operating conditions.
o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
q. Clean ducts, blowers, and coils if units were operated without filters during construction.
r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
s. Leave Project clean and ready for occupancy.

C. **Pest Control:** Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. **Comply** with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Government property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

3.2 CLOSEOUT SUBMITTALS

A. **General:** Prior to requesting Final Inspection, submit the following:

1. Project Record Documents, properly annotated and in the format required.
2. Copies of Warranties and Bonds.
3. Operation and Maintenance data.
4. All required operating or special tools required in individual sections.
5. All required keys and keying schedules.

3.3 PREREQUISITES TO FINAL ACCEPTANCE

A. **General:** Complete the following before requesting the CO/COTR's final inspection for certification of final acceptance, and final payment as required by the GENERAL CONDITIONS. List known exceptions, if any, in the request.

1. **Submit the final payment** request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. **Submit an updated final statement**, accounting for final additional changes to the Contract Sum.
3. **Submit a certified copy** of the CO/COTR's final punch-list of itemized work identified to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and has been endorsed and dated by the CO/COTR.
4. **Submit final meter readings for utilities**, a measured record of stored fuel, and similar data either as of the date of substantial completion, or else when the Government took possession of and responsibility for corresponding elements of the Work.
5. **Submit** consent of surety.

B. **Reinspection Procedures**: The CO/COTR will reinspect the Work upon receipt of the Contractor's notice that the work, including punchlist items resulting from earlier inspections, has been completed, except for these items whose completion has been delayed because of circumstances that are acceptable to the CO/COTR.

C. **Removal of Protection**: Except as otherwise indicated or requested by the Architect, remove temporary protection devices and facilities which were installed during the course of the work to protect previously completed work during the remainder of the construction period.

END OF SECTION 017701

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes administrative and procedural requirements for instructing Government personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training videotapes.

B. **Related Sections** include the following:

1. Division 01 Section "Allowances" for administrative and procedural requirements for demonstration and training allowances.
2. Division 01 Section "Project Management and Coordination" for requirements for preinstruction conferences.
3. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

C. **Unit Price for Instruction Time:** Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up. Provide unit prices for instructor costs and for video taping costs.

1.3 SUBMITTALS

A. **Instruction Program:** Submit two copies of outline of instructional program for demonstration and training, including 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. At completion of training, submit two complete training manual(s) for Government use.

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.

E. **Demonstration and Training Videotapes:** Submit two copies within seven days of end of each training module.

1. **Identification:** On each copy, provide an applied label with the following information:

   a. Name of Project.
   b. Name and address of photographer.
   c. Name of Architect.
   d. Name of Contractor.
   e. Date videotape was recorded.
   f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

2. **Transcript:** Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding videotape. Include name of Project and date of videotape on each page.

1.4 QUALITY ASSURANCE

A. **Facilitator Qualifications:** A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. **Instructor Qualifications:** A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

C. **Photographer Qualifications:** A professional photographer who is experienced photographing construction projects.

D. **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.

1.5 COORDINATION

A. **Coordinate instruction schedule** with Government operations. Adjust schedule as required to minimize disrupting Government operations.

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. Do not submit instruction program until operation and maintenance data has been reviewed and approved by CO/COTR.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. **Program Structure:** Develop an instruction program that includes individual training modules for each system and 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:

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.

2. **Documentation:** Review the following items in detail:

   a. Emergency manuals.
   b. Operations manuals.
   c. Maintenance manuals.
   d. Project Record Documents.
   e. Identification systems.
   f. Warranties and bonds.

g. Maintenance service agreements and similar continuing commitments.

3. **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.

4. **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.

5. **Adjustments:** Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. **Troubleshooting:** Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. **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.

8. **Repairs:** Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. **Facilitator:** Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Government for number of participants, instruction times, and location.

B. **Engage qualified instructors** to instruct Government personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Government will furnish an instructor to describe Government's operational philosophy.
3. Government will furnish Contractor with names and positions of participants.

C. **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 Government with at least seven days' advance notice.

D. **Evaluation:** At conclusion of each training module, assess and document each participant's mastery of module by use of a written 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.

3.3 DEMONSTRATION AND TRAINING VIDEOTAPES

A. **General:** When directed by the CO/COTR, engage a qualified commercial photographer to record demonstration and training videotapes. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

B. **Videotape Format:** Provide high-quality VHS color videotape in full-size cassettes, or other format as required by the CO/COTR.

C. **Recording:** Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

D. **Narration:** Describe scenes on videotape by audio narration by microphone while videotape is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

E. **Transcript:** Provide a typewritten transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

END OF SECTION 017901

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes the following:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. **Related Sections** include the following:

1. Division 01 Section "Summary" for general use of premises and project-specific Task Orders and construction documents for government-occupancy requirements.
2. Division 01 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
3. Division 01 Section "Cutting and Patching" for cutting and patching procedures.

1.3 DEFINITIONS

A. **Remove:** Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. **Remove and Salvage:** Detach items from existing construction and deliver them to the AOC ready for use.

C. **Remove and Reinstall:** Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. **Existing to Remain:** Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. **Historic items,** relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Government that may be encountered during selective demolition remain AOC's property.

Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to AOC.

1.5 SUBMITTALS

A. **Qualification Data:** For demolition firm shall be provided under the Base Contract.

B. **Schedule of Selective Demolition Activities:** Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Government on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Locations of proposed dust- and noise-control temporary partitions and means of egress.
6. Coordination of Government's continuing occupancy of portions of existing building and of Government partial occupancy of completed Work.
7. Means of protection for items to remain and items in path of waste removal from building.

C. **Inventory:** After selective demolition is complete, submit a list of items that have been removed and salvaged.

D. **Pre-demolition Photographs:** All photography will be performed upon request by AOC personnel.

E. **Landfill Records:** Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

A. **Demolition Firm Qualifications:** An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. **Refrigerant Recovery Technician Qualifications:** Certified by an EPA-approved certification program.

C. **Regulatory Requirements:** Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

D. **Standards:** Comply with ANSI A10.6 and NFPA 241.

E. **Pre-demolition Conference:** Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.7 PROJECT CONDITIONS

A. **General:** Government personnel will usually occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so government operations will not be disrupted. Comply with requirements specified in each project's Task Order or approved construction documents.

B. **Conditions existing at time of inspection** for bidding purpose will be maintained by Government as far as practical. Items to be removed by the Government prior to demolition, will be identified in the Task Order or in approved construction documents.

C. **Notify CO/COTR** of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. **Hazardous Materials:** Known hazardous materials will be identified in each project Task Order or in approved construction documents for construction to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

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

F. **Utility Service:** Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

A. **Existing Warranties:** Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. **Verify** that utilities have been disconnected and capped.

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

C. **Inventory and record** the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. **When unanticipated mechanical**, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to CO/COTR.

E. **When required** by the extent of the demolition within a given project, engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

F. **Survey of Existing Conditions:** As appropriate to the project, record existing conditions by use of preconstruction photographs requested from the AOC.

1. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

G. **Perform surveys** as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. **Existing Services/Systems:** Maintain services/systems indicated to remain and protect them against damage during selective demolition operations. Comply with requirements for existing services/systems interruptions specified in each project's Task Order or in approved construction documents.

B. **Service/System Requirements:** Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. **CO/COTR** will arrange to shut off indicated services/systems when requested by Contractor.
2. **Arrange** to shut off indicated utilities with utility companies.

3. **If services/systems** are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. **Cut off pipe or conduit** in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

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

1. **Comply** with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."

B. **Temporary Facilities:** Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. **Provide protection** to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. **Provide temporary weather protection**, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. **Protect walls**, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. **Cover and protect furniture**, furnishings, and equipment that have not been removed.
5. **Comply** with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."

C. **Temporary Shoring:** Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. **General:** Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. **Proceed with selective demolition systematically,** from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. **Neatly cut openings** and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. **Cut or drill** from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. **Do not use cutting torches** until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. **Maintain** adequate ventilation when using cutting torches.
6. **Remove decayed**, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. **Remove structural framing members** and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. **Locate selective demolition equipment** and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. **Dispose** of demolished items and materials promptly.

B. **Reuse of Building Elements:** Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish building elements beyond what is indicated on Drawings without Architect's approval.

C. **Removed and Salvaged Items:**

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to AOC.
4. Transport items to designated government AOC's storage area.
5. Protect items from damage during transport and storage.

D. **Removed and Reinstalled Items:**

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. **Existing Items to Remain:** Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. **Concrete:** Demolish in small sections. Cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

B. **Masonry:** Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. **Concrete Slabs-on-Grade:** Saw-cut perimeter of area to be demolished, then break up and remove.

D. **Resilient Floor Coverings:** Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.

1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

E. **Roofing:** Remove no more existing roofing than can be covered in one day by new roofing and so that building interior remains watertight and weather-tight.

1. **Remove** existing roof membrane, flashings, copings, and roof accessories.
2. **Remove** existing roofing system down to substrate.

F. **Air-Conditioning Equipment:** Remove equipment without releasing refrigerants.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. **General:** Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Government property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. **Do not allow** demolished materials to accumulate on-site.
2. **Remove and transport** debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. **Remove debris** from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. **Burning:** Do not burn demolished materials.

C. **Disposal:** Transport demolished materials off Government property and legally dispose of them.

3.7 CLEANING

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

3.8 SELECTIVE DEMOLITION SCHEDULE

A. **General:** Items and Construction to be removed, salvaged, and/or reinstalled will be identified for each project within the construction documents for the project.

END OF SECTION 024119

SECTION 028233 - REMOVAL & DISPOSAL OF ASBESTOS CONTAINING MATERIALS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. **General:** This section includes required procedures necessary to reduce air concentrations of asbestos to the specified level and maintain the specified asbestos control limits that is mandated during the life of the contract. It also includes procedures for the encapsulation, removal, containment, and disposal of asbestos containing materials.

1. Work Area: See Contract Drawings.

2. The following asbestos containing materials are to be disturbed or encapsulated:

Material or Surface	Asbestos Identified?	Space or Area

1.2 QUALITY ASSURANCE:

A. **Definitive Responsibility Criteria:**

1. **Qualifications For the Asbestos Abatement Contractor:**

a. **Asbestos Abatement Experience:** Provide the name and location of at least five (5) prior asbestos abatement projects, successfully performed by the selected Asbestos Abatement Contractor, that are comparable in scope of work, structure, project costs and in complexity. For each project include the name and current telephone number of the project's contract representative. Address how each project is comparable in scope of work, structure, project costs and complexity.

b. **Project Documents:** Provide copies of the daily logs and air monitoring reports including final clearance sample results, for the five abatement projects submitted in response to the preceding paragraph.

c. **Pollution Liability Insurance:** Submit proof of Pollution Liability Insurance coverage. If the completion date of the bid project is beyond the effective dates of the Pollution Liability Insurance coverage, then the selected contractor shall submit a

statement stating it is understood, that this Pollution Liability Insurance coverage, shall remain in effect throughout the duration of this contract.

d. **Federal/State EPA and OSHA citations**: Provide a list all federal and State EPA or OSHA citations the Contractor has received in the last five (5) years.

2. **Qualifications for the Supervisor / Competent Person:** Provide the name and experience record of the proposed Supervisor/Competent Person and foreman, the selected Asbestos Abatement Contractor, will assign to this project. Provide evidence that the proposed Supervisor/Competent Person has supervised at least five (5) asbestos abatement contracts of comparable scope and complexity.

   a. **Accreditation:** Provide evidence that shows the proposed Supervisor/Competent Person, is accredited as an asbestos Contractor/Supervisor as described in 40 CFR Part 763 (EPA's Model Accreditation Plan).

3. **Qualifications for the Certified Industrial Hygienist (CIH):** Provide the name and experience record of the CIH selected to perform the duties outlined in "Project Certified Industrial Hygienist" below. Provide evidence showing that, in the last five years, the selected CIH has performed abatement oversight on projects of comparable scope and complexity.

   a. **Certification, Accreditation and Training:** Provide evidence that shows the selected CIH (1.) is certified in Comprehensive Practice by the American Board of Industrial Hygiene (ABIH) (2.) is currently accredited as an Asbestos Building Inspector, Contractor/Supervisor, and Project Designer as described in 40 CFR Part 763 (3.) has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course *Sampling and Evaluating Airborne Asbestos Dust* or equivalent (4.) is currently registered in the American Industrial Hygiene Association's (AIHA) *Asbestos Analytical Registry* (5.) is currently participating in their *Proficiency Analytical Testing* (PAT) certification program.

   b. **Errors and Omissions Insurance:** Provide evidence showing the Project CIH has Errors and Omissions Insurance coverage. If the completion date of the project is beyond the effective dates of the insurance coverage, submit documentation stating that the CIH(s) Errors and Omissions Insurance coverage will be kept current and in effect for the duration of the project.

4. **Qualifications for the Industrial Hygienist (IH):** Name of and experience record of the Industrial Hygienist(s) (IH) , the CIH selects, who are qualified by virtue of their training and work experiences, to perform duties assigned by the CIH. Show experience on 5 projects of comparable scope and complexity, that the IH has overseen in the last five years. Provide evidence that:

   a. The selected IH is currently Accredited as an asbestos building inspector, Contractor/Supervisor, and Project Designer as described in 40 CFR Part 763.

b. The selected IH has successfully completed the NIOSH 582 course Sampling and Evaluating Airborne Asbestos Dust or equivalent and is currently registered in the American Industrial Hygiene Association's (AIHA) Asbestos Analytical Registry.
c. The selected IH is currently participating in their (PAT) certification program.

5. **Testing Laboratory Qualifications:** Proof of qualifications of testing laboratory and personnel as follows:

a. **Accreditation:** Provide proof of accreditation by the AIHA for asbestos analysis, and the NIST under National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis.
b. **Proficiency:** Provide the two most recent consecutive quarterly reports showing the laboratory analyzing the samples has been judged proficient by successful participation in the NIOSH's PAT certification and Bulk Asbestos Proficiency Analytical Testing (ELPAT) programs.
c. **Laboratories and Microscopists:** Provide proof the laboratory(s) selected to analyze project samples is accredited by the American Industrial Hygiene Association (AIHA), holds appropriate state license and successful participation of the laboratory in the Proficiency Analytical Testing (PAT) Program. For microscopists to analyze fibers-in-air samples on site, provide proof that they have been judge by current inclusion on the AIHA Asbestos Analyst's Registry (AAR).
d. **Errors and Omissions Insurance:** Provide evidence showing the laboratory has Errors and Omissions Insurance coverage. If the completion date of the project is beyond the effective dates of the insurance coverage, submit documentation stating that the laboratory's Errors and Omissions Insurance coverage will be kept current and in effect for the duration of the project.

B. **Contractors performing** asbestos abatement work for the Architect of the Capitol in the District of Columbia are required to be licensed to do asbestos work in the District of Columbia. The Contractor shall comply with the licensing regulations of:

Government of the District of Columbia
Department of Consumer and Regulatory Affairs (DCA)
Environmental Regulation Administration
51 N Street NE
5th Floor
Washington, DC 20002

C. **Contractor employees** assigned to active asbestos work areas in the District of Columbia must be licensed by the District of Columbia as trained asbestos workers and supervisors. The Abatement Personnel shall have completed the EPA AHERA/OSHA abatement worker/supervisor course; have training on the standard operating procedures of the Abatement Contractor; have one year of asbestos abatement experience; have applicable medical and respiratory protection documentation; have certificate of training and State accreditation/license.

D. **Asbestos Control Limits:** The enclosed work areas shall be defined as a regulated area in accordance with 29 CFR 1910.1001 and 29 CFR 1926.1101.

1. **Inside Asbestos Work Area:** For personnel wearing negative-pressure respirators, air concentrations of asbestos shall not exceed an 8-hour time weighted average of 0.1 fibers (longer than 5 microns), per cubic centimeter of air as determined by the NIOSH 7400 method. Regardless of respiratory protection worn, air concentrations inside the work area will not exceed an 8-hour time weighted average of one (1) fiber per cubic centimeter as determined by the NIOSH 7400 method. In the event that this level is exceeded, all work in the asbestos work area shall stop and may not restart until fiber levels are below an 8-hour time weighted average of one (1) fiber per cubic centimeter as determined by the NIOSH 7400 method. It is the responsibility of the Contractor to provide an independent industrial hygiene consultant to provide the required personal air monitoring and to assure that all safety and health procedures are followed.
2. **Outside Asbestos Work Area:** Air concentrations of asbestos shall not exceed 0.01 fibers (longer than 5 microns) per cubic centimeter of air as determined by the NIOSH 7400 method. This applies to all areas in the building while work is in progress, except for the asbestos work area. Anytime this level is exceeded, all work in the asbestos work area will be stopped and may not restart until approval from the AOC/SOHB is given. To assure compliance with this provision, the government may provide (in addition to the approved sampling plan), air monitoring outside the Contractor's work area. If used, the government's industrial hygienist will have unrestricted access to the Contractor's work site. If the asbestos abatement Contractor wishes, he may perform any additional air sampling to assure compliance and for comparison with this specification.

E. **Project Certified Industrial Hygienist (Project CIH):** The primary Contractor shall engage the services of a CIH certified in Comprehensive Practice by the American Board of Industrial Hygiene (ABIH) for the period of this contract. Selection of the Project CIH is subject to approval of the Architect. This person is responsible for all environmental oversight of this contract. Although contracted by the General Contractor, the Project CIH is responsive to the Architect. During the contract period, the Project CIH is required to be on call and to be on project site within two hours after notification by the Architect. Additionally, the Project CIH will arrange for another Architect approved CIH, to be a back-up, to cover duties assigned under this specification, in the event that the selected Project CIH is not able to be on site as required or cannot report to the project site within the allotted 2 hours. Responsibilities for the Project CIH include but shall not be limited to the following:

1. **Coordination meeting.** Immediately after selection the Project CIH will contact the Architect to schedule a coordination meeting. Suggested attendees to this meeting are: the AOC Construction Manager, a representative of the AOC/SOHB, and a representative of the AOC jurisdiction where the work is being performed. The purpose of this coordination meeting is to establish a clear working knowledge of the project and the responsibilities of the Project CIH with the Architect's staff.
2. **Certify**, that prior to beginning any abatement activity, all personnel is trained in accordance with OSHA 29 CFR 1926.1101 (k)(9) and any additional State/Local

requirements. Training must include, at a minimum, the elements listed at 29 CFR 1926.1101 (k)(9)(viii). Training shall have been conducted by a third party, EPA/State approved trainer meeting the requirements of EPA 40 CFR 763 Appendix C (AHERA MAP). Provide copies of the initial training certificates and all refresher taken to date.

3. **Certify** that medical examinations meeting the requirements of 29 CFR 1926.1101 (m) are provided for all personnel working in the regulated area, regardless of exposure levels. The physician's written opinion as required by 29 CFR 1926.1101 (m)(4) shall be provided for each person and shall include in the opinion the person has been evaluated for working in a heat stress environment while wearing personal protective equipment and is able to perform the work.
4. **Review,** approve and submit for review to the Architect:

    a. **All asbestos abatement plans** of action for conformance to applicable referenced standards and this specification.
    b. **All submittals** (except initial submittal of contractor qualification information) the Contractor submits under paragraph 1.4.
    c. **All sampling data** within the time frames outlined in this specification.

5. **Review,** approve and submit to the Architect for review all required Material Safety Data Sheets (MSDS) submitted by the Contractor.
6. **Inspect and or oversee** the inspection of, asbestos abatement removal work for conformance with the approved plan.
7. **Develop and submit** for review a daily monitoring plan to test airborne levels of asbestos to determine exposure levels. The plan will include all personal, area, and final air samples to be used to clear a containment area.
8. **Perform daily monitoring** in accordance with the approved plan.
9. **Ensure all work** is performed in strict accordance with this specification at all times.
10. **Ensure hazardous exposure** to personnel and to the environment are adequately controlled at all times.
11. **The Project CIH shall visually inspect** and approve all asbestos containment areas before asbestos containing materials are removed and before performing any final air tests.
12. **At the direction** of the AOC/SOHB, the Project CIH shall investigate possible contaminations and contamination related complaints. The Project CIH, shall perform any necessary sampling and/or site investigations in order to develop findings and conclusions of the reported incidence. Submit a verbal report that outlines all findings of the investigation to the AOC/SOHB within 24 hours of the initial notice. Submit a final written report to the AOC/SOHB within 3 work days of the initial notice.
13. **With the approval of the Architect the Project CIH** may select IH (s) to perform duties assigned by the Project CIH. The selected IH (s) shall be under the direct supervision of the Project CIH, who will be responsible for IH(s) job performance, and will review and approve all results of their work. The selection of IH (s) shall be based on their training and work experiences and will be subject to the approval of the Architect.
14. **PPE:** Establish the Personal Protective Equipment (PPE) daily.

F. **Project Competent Person**: The abatement contractor shall assign a competent person as defined in 29 CFR 1926.1101, as a person who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate them. This person shall meet the criteria outlined in paragraph 1.2.A.2, of this specification and is required to be on site supervising the work. Responsibilities for the Project Competent Person include but shall not be limited to the following:

1. Comply with the requirements outlined in 29 CFR 1926.1101, paragraph (o) *Competent Person.*
2. Follow the requirements outlined by the Project CIH.
3. Limit access to the abatement area by permitting only authorized personnel and personnel listed in "Access to Work Area" below to enter.
4. No employee shall be allowed to wear a respirator unless a physician has determined they are capable of doing so and has issued a written opinion for that person.
5. All personnel wearing respirators shall have a current qualitative/quantitative fit test which was conducted in accordance with 29 CFR 1910.134 (f) and Appendix A. Fit tests shall be done for PAPRs with the blower off.
6. The Competent Person shall assure that the positive/negative fit check is done each time the respirator is donned by an employee. Head coverings must cover respirator head straps. Any situation that prevents an effective face piece to face seal as evidenced by failure of a fit check shall preclude that person from wearing a respirator until resolution of the problem.
7. Maintain a daily log of all persons who enter and exit the work area until the containment is authorized for removal.
8. Working with the project CIH, ensure that all documents are filed in the final report due three days after the containment is authorized for removal.
9. Ensure that only personnel with current EPA accreditation and DC asbestos license, perform abatement work in the work area.

1.3 REFERENCES:

A. **American National Standards Institute (ANSI) Publication:**

1. Z9.2-79 - Fundamentals Governing the Design and Operation of Local Exhaust Systems

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

1. E 849-82 - Safety and Health Requirements relating to Occupational Exposure to Asbestos

C. **Code of Federal Regulations (CFR):**

1. 29 CFR 1910.1001, Occupational Safety and Health Act (OSHA), INCLUDING Appendix A through I.
2. 29 CFR 1910.20, Subpart C, General Safety and Health Provisions.

3. 29 CFR 1910.134, OSHA General Industry Respirator Requirements.
4. 29 CFR 1926.1101. Occupational Exposure to Asbestos, Construction Industry Standard, INCLUDING Appendix A through K.
5 40 CFR Part 61, Subpart M: U.S. Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants (NESHAP) Asbestos.

D. **State and Local Regulations:**

1. Applicable state and local regulations shall apply.

E. **Architect of the Capitol**

1. The Architect of the Capitol's *Uniform Asbestos Management Program.*
2. Other special requirements listed by the AOC.

1.4 **SUBMITTALS:**

A. **General:** Transmit all submittals to the Architect for review.

B. **Initial Submittal of Asbestos Abatement Contractor or Subcontractor Qualification Information:** Items 1 through 3 below are to be submitted as a complete package after the bid receipt, but are required to be reviewed by the AOC Safety and Environmental Division (AOC/SOHB) prior to Notice to Proceed.

1. **Asbestos Abatement Contractor or Subcontractor Qualification Information:** Submit for review, the name, address, telephone number and required documentation of qualifications of the Asbestos Abatement Contractor or Subcontractor, selected for this contract.
2. **Certified Industrial Hygienist (Project CIH):** Submit name, address, telephone number and required documentation of qualifications of the Certified Industrial Hygienist selected to perform the duties outlined in 1.2.E above.
3. **Experience and Qualifications of Supervision:** Submit name of and required documentation of qualifications of the proposed competent person who would be assigned to this project, as outlined in "Definitive Responsibility Criteria" above.

C. **Post-Award Asbestos Abatement Submittal:** Items listed below are to be submitted after the award, but are required to be reviewed and recommended approved, by the Project Certified Industrial Hygienist (CIH) prior to submission to the Safety and Occupational Health Branch or his designated representative. These actions must be completed prior to starting work.

1. **Experience and Qualifications of Workers:** Name and experience record, if any, of workmen who will be assigned to this project. Include for each person evidence of successful completion of State of Maryland or Commonwealth of Virginia training given by qualified personnel. Provide certification that employees meet the OSHA medical surveillance requirements.

2. **License Information:** Provide a copy of a current District of Columbia Asbestos Contractor's License and Individual Asbestos License for asbestos projects in the District of Columbia.
3. **CIH Approved Plan of Action:** Before start of work submit the design and layout of the regulated area and the negative air machines. The submittal shall indicate the number of, location of, and size of negative air machines. The point(s) of exhaust, air flow within the regulated area, anticipated negative pressure differential, and supporting calculations for sizing shall be provided. In addition, submit the following:

   a. Manufacturer's information on the negative air machine(s).
   b. Method of supplying power to the units and designation/location of the panels.
   c. Description of testing method(s) for correct air volume and pressure differential.
   d. Provide manufacturer's product data on the pressure differential measuring device used.

   There will be 4 air exchanges required with minus 0.02 inch of water pressure differential. The plan must include the location and layout of each containment and decontamination areas, the sequencing of asbestos work, the interface of trades involved in the performance of work, methods to be used to assure the safety of building occupants and visitors to the site. The plan must explain the use of portable HEPA ventilation systems, identify the means of isolating the building's HVAC system during removal operations, detail the method of removal to prohibit emissions into the work area, and identify the method of packaging the asbestos waste. No locally exhausted HEPA filtered drills or saws shall be used as the sole means of containment of drilling or cutting asbestos-containing materials unless prior approval is given by the AOC/SOHB.
4. **Project CIH Approved Area Sampling Plan:** Submit a detailed plan which shows the proposed air sampling strategy to be used to comply with the requirements specified. This plan must be separate from the CIH approved plan of action. Show all locations where sampling will occur during the asbestos abatement operation.
5. **Temporary Storage of Containerized Asbestos Waste:** Submit a request to the AOC, requesting a location for temporary storage of containerized asbestos waste that is generated by this project.
6. **Project CIH Approved Disposal Plan:** Submit to the Architect a disposal plan including the location of the approved disposal site and the contractor's method for documenting proper asbestos disposal. Detail the methods by which the containerized asbestos waste is taken from the work area to the temporary storage area.
7. **IH qualifications:** Submit the name and required documentation of qualifications of the proposed IH (s)for this project.
8. **NESHAP Notification Requirements**: The contractor shall coordinate with the AOC/SOHB, in submitting the appropriate written notification. Any costs incurred due to expiration of the EPA NESHAP notice before completing assigned abatement work will be at the expense of the Contractor. For the purpose of this contract, initial and all changes to the initial notification shall be postmarked by the appropriate addressee below, at least 10 working days and 35 calendar days respectively, prior to the start of asbestos abatement work:

a. Ten (10) working days prior to beginning asbestos abatement work notify:

U. S. Environmental Protection Agency Region III
Pesticides/Asbestos
Programs and Enforcement Branch
Mail Code: 3WC32
1650 Arch Street
Philadelphia, PA 19107

And

District of Columbia
Department of Health
Air Quality Division
51 N Street NE
Washington, DC 20002
Phone: (202) 535-2259
FAX Number 202-535-1371

Thirty Five (35) days prior to beginning asbestos abatement work notify:

AOC, Safety and Occupational Health Branch (AOC/SOHB)
Ford House Office Building
Room HOB2-553
Washington DC 20515
Phone: (202) 225-4043
FAX NUMBER (202) 226-9915

And the affected AOC Building Superintendent to satisfy the District of Columbia's building occupant asbestos abatement notification requirement.

b. **Changes to the original NESHAP Notification:** Any changes to the original notification, shall be coordinated with the AOC/SOHB prior to submission. After this coordination, the Contractor shall submit changes to the original notification, pursuant to the NESHAP requirements, within the time frames specified and to the appropriate jurisdiction listed above.

c. **Emergency NESHAP Notices:** The Contractor, shall contact the AOC/SOHB, for procedures regarding the submission of any emergency notifications, pursuant to the NESHAP requirements.

9. **AOC Asbestos Project Number:** Contact the AOC/SOHB at 202-225-4043 for this number. This Asbestos Control Number will be used in all documents concerning this project.

10. **Certificates of Compliance:** RESERVED

11. **Information on Encapsulating Material:** Submit written evidence that material meets the the specified characteristics and the latest requirements of the EPA.
12. **Laboratory Qualification Information:** Submit proof of required qualifications of testing laboratory and their personnel. See "Testing Laboratory Qualifications".
13. **Containers For Disposal of Friable Asbestos:** Submit for review, the manufacturers cut sheet for the bags and containers the contractor intends to use to dispose of the asbestos containing material. Bags shall be minimum of 6 mil polyethylene (or equivalent) and labeled in accordance with 40 CFR Part 61 subpart M (NESHAP) and 29 CFR 1926.1101.
14. **Decontamination Facility:** Unless otherwise specified by the AOC/SOHB, throughout the time that asbestos abatement is taking place, the Asbestos Abatement Contractor will maintain a working three-stage decontamination facility at the point of access to the containment. As a minimum, the decontamination facility will consist of a clean changing area, an air space, a shower, another air space, and a contaminated changing area. The size and location of this facility shall be reviewed by the AOC/SOHB.
15. **Sequencing/Scheduling:** Submit for review, the sequencing and/or scheduling for each containment or containments being performed under this contract, to the AOC/SOHB.
16. **Filtering for vacuums and exhaust equipment** shall conform to ANSI Z9.2. HEPA filters shall be used in all vacuums and exhaust equipment. All HEPA filtered vacuums and exhaust equipment shall be tested for integrity with a Dioctylphthalate (DOP) or Dioctylsubacate (DOS) smoke generator. Submit evidence showing that all HEPA filtered vacuums and exhaust equipment, scheduled for use under this Contract, have been tested and passed an DOP or DOS smoke generator.
17. **HEPA Filter Replacement:** If any HEPA filtered vacuums or ventilation equipment requires HEPA filter replacement during this abatement operation, another dioctylpthalate (DOP) test shall be performed. The results of the dioctylpthalate (DOP) test shall be submitted when received and reviewed by the AOC/SOHB before re-using the equipment under this Contract.
18. **Encapsulant Requirements:** Submit, before the start of work, the manufacturer's technical data for all types of encapsulant used on the project. Provide application instructions. Submit certification data as required in Encapsulant section. Submit MSDS for each material in compliance with 29 CFR 1910.1200. Submit certification from manufacturer that material it will adequately wet ACM as per NESHAP requirements.

D. **During-Work Asbestos Abatement Submittal:** After review and approval by the Project CIH, submit items required under 1.4D1 and 1.4D2 to the AOC/SOHB as the work progresses and at the times specified.

1. **Air Monitoring and Work Area Inspections:**

   a. **Air Monitoring Results:** Post for all workers to see, within 24 hours of collection, the results of all air monitoring conducted. Post the results at a location designated by the General Contractor and notify the AOC/SOHB. A copy of the results shall be provided to the AOC/SOHB within the same time frame.
   b. **Differential Air Pressure Readings:** Starting when a negative pressure containment is erected and approved by the Project CIH, a strip chart recorder shall be installed

and work area relative pressure shall be monitored 24 hours a day until final air clearances are produced. Submit a copy of the daily strip chart record to the AOC/SOHB within 24 hours after the recording was made.

c. **Work Area Inspections:** The Project CIH shall personally perform a visual inspection of the abatement work area for the pre-removal, pre-final, and re-occupancy stage. The Project CIH or the IH(s) working for the Project CIH, will perform visual inspections of the abatement work area daily and pre-final. Submit documentation of the daily, pre-removal, pre-final inspections to the AOC/SOHB, within 24 hours of completion. Documentation of the re-occupancy stages of the work inspection shall be submitted to the AOC/SOHB as soon as completed.

2. **Transporting and Disposing of Asbestos Containing Materials (ACM):**

a. **Disposal Receipts:** Submit receipts from the transporter, that acknowledge the contractor's shipment of ACM from the site (NESHAP Waste Shipment Records) within three (3) days following removal of ACM from the premises. Provide on each receipt the date, quantity of material removed, and signature of an authorized representative of the transporter. A signed and dated copy to the Waste Shipment Record, showing receipt at an authorized landfill, must be received by AOC/SOHB within 10 calendar days of the date of the shipping receipt.

b. **Transportation Vehicles:** Transportation shall be in vehicles dedicated to asbestos transportation. Vehicles shall be marked in accordance with DOT and NESHAP regulations.

E. **Final Submittal:** After review and approval by the Project CIH, submit items required under 1 and 2 below to the AOC/SOHB within 3 calendar days at the completion of work for each containment. The CIH shall submit a project report consisting of:

1. The daily log book information and documentation of events during the abatement project.
2. Copies of all waste shipment records for asbestos waste sent to the designated landfill.
3. The report shall include a certificate of completion.
4. All air and bulk sampling conducted for this project.
5. All final air clearance data.
6. All perimeter samples.
7. Copies of training certificates for all personnel engaged in this abatement work.
8. Copies of respirator fit tests for all personnel engaged in this abatement work.
9. Copies of the OSHA required asbestos and respirator medical clearances for all personnel engaged in this abatement work.
10. The final report shall include an executive summary. The executive summary must show:

a. A summary of the work done.

b. A statement that all personnel conducting this abatement operation had all required training and were medically cleared to perform this type of work in accordance with OSHA, EPA regulations and all State and Local laws, rules and regulations.

c. The executive summary must also show that all final air samples results were below the limits established by EPA, the District of Columbia, and this specification and declare the area ready for re-occupancy.
d. Describe the type, application, and quantity of asbestos containing materials removed by the contractor.
e. Include all copies of the final air and bulk sampling as performed by a third party.
f. Indicate that all building systems disturbed by the contractor during the work under the contract have been reinstalled and are in working order.

1.5 CONTRACTOR RESPONSIBILITY:

A. **The Contractor** shall assume full responsibility and liability for compliance with all applicable Federal, State, and local regulations pertaining to the protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations, and shall hold the government harmless for failure to comply with any applicable safety or health regulation on the part of himself, his employees, or his subcontractors.

B. **The Contractor shall** secure all necessary permits in conjunction with asbestos removal, hauling and disposition and provide timely notification of such actions, as may be required by federal, state, regional, and local authorities. For this project, ensure that notification to the Regional Office of the EPA and the District of Columbia is made, and provide copies of the notification to the AOC/SOHB 10 days prior to the commencement of the work. Provide notification in accordance with 40 CFR 61.22(d)(1).

C. **The Contractor** shall inform the affected building Superintendent and the AOC/SOHB not less than thirty five (35) days prior to commencement of the asbestos abatement, of the health or safety factors that necessitate the asbestos abatement and procedures that will be taken to protect the health, safety, and possessions of the building occupants.

D. **Site Security:**

1. **Regulated area** access is to be restricted only to authorized, trained/accredited and protected personnel. These may include the Abatement Contractor's employees, employees of Subcontractors, AOC employees and representatives, State and local inspectors, and any other designated individuals. A list of authorized personnel shall be established prior to commencing the project and be posted in the clean room of the decontamination unit.
2. **Entry into** the regulated area by unauthorized individuals shall be reported immediately to the Competent Person.
3. **A log book** shall be maintained in the clean room of the decontamination unit. Anyone who enters the regulated area must record their name, affiliation, time in, and time out for each entry.
4. **Access to the** regulated area shall be through a single decontamination unit. All other access (doors, windows, hallways, etc.) shall be sealed or locked to prevent entry to or exit from

the regulated area. The only exceptions for this requirement are the waste load-out area which shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits. Emergency exits shall not be locked from the inside, however, they shall be sealed with poly sheeting and taped until needed.

5. **The Abatement Contractor's** Competent Person shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel. Containment shall be locked out when the competent person leaves the site. The entrance to the regulated area requires all entrants to be logged in/out so that only authorized personnel are allowed entrance.
6. **The Abatement Contractor** will have the AOC's assistance in notifying adjacent personnel of the presence, location, and quantity of ACM in the regulated area and enforcement of restricted access by the AOC's employees.
7. **The Abatement Contractor** shall provide plans to secure the regulated area during non-working hours.

E. **Emergency Action Plan and Arrangements:**

1. **An Emergency Action Plan** shall be developed by the Abatement Contractor prior to commencing abatement activities and shall be agreed to by the Abatement Contractor and the AOC. The Plan shall meet the requirements of 29 CFR 1910.38 (a);(b).
2. **Emergency procedures shall** be in written form and prominently posted in the clean room and equipment room of the decontamination unit. Everyone, prior to entering the regulated area, must read and sign these procedures to acknowledge understanding of the regulated area layout, location of emergency exits and emergency procedures.
3. **Emergency planning** shall include written notification of police, fire, and emergency medical personnel of planned abatement activities; work schedule and layout of regulated area, particularly barriers that may affect response capabilities.
4. **Emergency planning** shall include consideration of fire, explosion, hazardous atmospheres, electrical hazards, slips/trips and falls, fiber release episodes, confined spaces, and heat stress illness. Written procedures addressing emergency situations shall be developed. Employees need to be aware of these procedures.
5. **Employees shall** be trained in regulated area/site evacuation procedures in the event of workplace emergencies.

    1. **For non life-threatening** situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the regulated area to obtain proper medical treatment.
    2. **For life-threatening** injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, remove them from the regulated area, and secure proper medical treatment.

6. **Telephone numbers** of all emergency response personnel shall be prominently posted in the clean room, along with the location of the nearest telephone.

7. **The Emergency Action Plan** shall provide for a contingency plan in the event that an incident occurs that may require the modification of the standard operating procedures during abatement. Such incidents include, but are not limited to, fire; accident; power failure; negative pressure failure; and supplied air system failure. The Abatement Contractor shall detail procedures to be followed in the event of an incident assuring that work is stopped and wetting is continued until correction of the problem.

1.6 PROJECT/SITE CONDITIONS:

A. **Means of Egress:** Establish and maintain emergency and fire exits from the work area.

B. **Environmental Conditions to be Maintained:** Normal environmental conditions (heat, light, air conditioning) must be maintained outside of the work area.

C. **Decontamination Facilities:** Provide each work area with separate personnel decontamination facility (PDF) and equipment decontamination facilities (EDF). Ensure that the PDF is the only means of ingress and egress to the regulated area and that all equipment, bagged waste, and other material exit the regulated area only through the EDF. See OSHA 29 CFR 1926.1101, Appendix F. The size and location of this facility shall be reviewed by the AOC/SOHB.

1. **General Requirements**. All personnel entering or exiting a regulated area shall follow the requirements of 29 CFR 1926.1101 (j)(1) and these specifications. All equipment and materials must exit the regulated area through the EDF and be decontaminated in accordance with these specifications. Walls and ceilings of the PDF and EDF must be constructed of a minimum of 2 layers of 6 mil, clear/opaque/black/ white fire retardant polyethylene sheeting and be securely attached to existing building components and/or an adequate temporary framework. A minimum of 2 layers of 6 mil poly shall also be used to cover the floor under the EDF and PDF units. Construct doors so that they overlap and secure to adjacent surfaces. Weigh sheets with layers of duct tape so that they close quickly after release. Put arrows on sheets so they show direction of travel and overlap. Construct a solid barrier on the occupied side(s) to protect the sheeting if the area adjacent to the abatement is occupied,.
2. **Temporary Facilities to the PDF and EDF**. The Competent Person shall provide temporary water service connections to the EDF and PDF. Water supply must be of adequate pressure and meet requirements of 29 CFR 1910.141(d)(3). Provide adequate temporary electric power with ground fault protection and overhead wiring in the EDF and PDF. Provide a sub-panel for all temporary power in the clean room. Provide adequate lighting to maintain a minimum of 50 foot candles in the EDF and PDF. Provide temporary heat to maintain 70 deg F throughout the PDF and EDF except the shower of the PDF shall be maintained at 75 deg F.
3. **Personnel Decontamination Facility (PDF**). The Competent Person shall provide a PDF consisting of shower room which is contiguous to a clean room and equipment room. The PDF must be sized to accommodate the number of personnel scheduled for the project. The shower room, located in the center of the PDF, shall be fitted with as many portable showers as necessary to insure all employees can complete the entire decontamination procedure

within 15 minutes. The PDF shall be constructed of opaque poly for privacy. The PDF shall be constructed to eliminate any parallel routes of egress without showering.

4. **Clean Room:** The clean room must be visually separated from the rest of the building to protect the privacy of personnel changing clothes. The clean room shall be constructed of at least 2 layers of 6 mil fire retardant poly to provide an air tight room. Provide a minimum of 2 flapped doorways 3 feet wide. One doorway shall be the entry from outside the PDF and the second doorway shall be to the shower room of the PDF. The floor of the clean room shall be maintained in a clean, dry condition. Shower overflow shall not be allowed into the clean room. All surfaces in the clean room shall be disinfected twice after each shift change. An adequate supply of disposable towels and disposable protective clothing shall be present in the clean room. Provide up to 2 storage lockers per person. A portable fire extinguisher, Type ABC, shall be provided in accordance with OSHA and NFPA Standard 10. All persons entering the regulated area shall remove all street clothing in the clean room and dress in disposable protective clothing and respiratory protection. Any person entering the clean room does so either from the outside with street clothing on or is coming from the shower room without clothing or with bathing suits and thoroughly washed. Ensure that females, who are required to enter the regulated area be ensured of their privacy throughout the entry/exit process by posting guards at both entry points to the PDF so no male can enter or exit the PDF during her stay in the PDF.
5. **Shower Room**: The Competent Person shall assure that the shower room is a completely water tight compartment to be used for the movement of all personnel from the clean room to the equipment room and for the showering of all personnel going from the regulated area to the clean room. Each shower shall be constructed so water runs down the walls of the shower and into a drip pan. Install a freely draining smooth floor on top of the shower pan. The shower room shall be separated from the rest of the building and from the clean room and equipment room using air tight walls made from at least 2 layers of 6 mil fire retardant poly. The shower shall be equipped with a shower head and controls, hot and cold water, drainage, soap dish and continuous supply of soap, and shall be maintained in a sanitary condition throughout its use. The controls shall be arranged so an individual can shower without assistance. Provide a flexible hose shower head. Waste water will be pumped to a drain after being filtered through a minimum of a 100 micron sock in the shower drain; a 20 micron filter; and a final 5 micron filter. Filters will be changed a minimum of daily or more often as needed. Filter changes must be done in the shower to prevent loss of contaminated water. Hose down all shower surfaces after each shift and clean any debris from the shower pan. Residue is to be disposed of as asbestos waste.
6. **Equipment Room**: The Competent Person shall provide an equipment room which shall be an air tight compartment for the storage of work equipment, reusable footwear and for use as a change station for personnel exiting the regulated area. The equipment room shall be separated from the regulated area by a minimum 3 foot wide door made of three layers of 6 mil fire retardant poly. The equipment room shall be separated from the regulated area, the shower room and the rest of the building by air tight walls and ceiling constructed of a minimum of 2 layers of 6 mil fire retardant poly. If the airborne level of asbestos in the regulated area is expected to exceed 0.5 f/cc, add an additional air-lock between the equipment room and the regulated area. Damp wipe all surfaces of the equipment room after each shift change. Provide an additional loose layer of 6 mil fire retardant poly per

shift change and remove this layer after each shift. Provide a temporary electrical sub-panel in this room to accommodate any power tools and equipment used in the regulated area.

7. **PDF construction shall be:** Clean room at the entrance followed by a shower room followed by an equipment room leading to the regulated area. Each doorway in the PDF is minimum of double flaps of 6 mil fire retardant poly.
8. **Equipment Decontamination Facility (EDF)**. The Competent Person shall provide an EDF consisting of a wash room, and clean room for removal of equipment and material from the regulated area. Personnel shall not enter or exit the EDF except in the event of an emergency. Clean debris and residue in the EDF daily. All surfaces in the EDF shall be wiped/hosed down after each shift and all debris shall be cleaned from the shower pan. The EDF shall consist of the following:

    a. **Wash Down Station:** Provide an enclosed shower unit in the regulated area just outside the Wash Room as an equipment bag and container cleaning station.
    b. **Wash Room**: Provide a wash room for cleaning of bagged or containerized asbestos containing waste materials passed from the regulated area. Construct the wash room using materials selected and furnished by the Abatement Contractor and 2 layers of 6 mil fire retardant poly. Locate the wash room so that packaged materials, after being wiped clean, can be passed to the Holding Room. Doorways in the wash room shall be constructed of two layers of 6 mil fire retardant poly.
    c. **Holding Room**: Provide a holding room as a drop location for bagged materials passed from the wash room. Construct the holding room using materials selected and furnished by the Abatement Contractor and 2 layers of 6 mil fire retardant poly. The holding room shall be located so that bagged material cannot be passed from the wash room to the clean room unless it goes through the holding room. Doorways in the holding room shall be constructed of two layers of 6 mil fire retardant poly.
    d. **Clean Room:** Provide a clean room to isolate the holding room from the building. Construct the clean room using materials selected and furnished by the Abatement Contractor and 2 layers of 6 mil fire retardant poly. The clean room shall be located so as to provide access to the holding room from the building. Doorways to the clean room shall be constructed of two layers of 6 mil fire retardant poly. When a negative pressure differential system is used, a rigid enclosure separation between the EDF clean room and the adjacent areas shall be provided.
    e. **EDF construction shall be:** Wash Room leading to a Holding Room followed by a Clean Room leading to the building.

9. **Equipment Decontamination Procedures:** At wash down station in the regulated area, thoroughly wet clean contaminated equipment and/or sealed polyethylene bags and pass into Wash Room after visual inspection. When passing anything into the Wash Room, close all doorways of the EDF, other than the doorway between the wash down station and the Wash Room. Keep all outside personnel clear of the EDF. Once inside the Wash Room, wet clean the equipment and/or bags. Close all doorways except the doorway between the Holding Room and the Clean Room. Workers from the Clean Room/Exterior shall enter the Holding Room and remove the decontaminated/cleaned equipment/bags for removal and disposal.

These personnel shall wear full protective clothing and appropriate respirators. At no time shall personnel from the clean side be allowed to enter the Wash Room.

D. **Access to Work Area:** Only approved personnel are authorized access to the work area. Once asbestos removal has started, access to the abatement work area by non-approved personnel is not permitted unless authorized by the AOC/SOHB representative, the Project CIH or the competent person. Access to work areas shall always be through decontamination areas. No employee shall be allowed to wear a respirator unless a physician has determined they are capable of doing so and has issued a written opinion for that person. All personnel wearing respirators shall have a current qualitative/quantitative fit test which was conducted in accordance with 29 CFR 1910.134 (f) and Appendix A. Fit tests shall be done for PAPRs with the blower off. The Competent Person shall assure that the positive/negative fit check is done each time the respirator is donned by an employee. Head coverings must cover respirator head straps. Any situation that prevents an effective face piece to face seal as evidenced by failure of a fit check shall preclude that person from wearing a respirator until resolution of the problem. The Project CIH shall review work area air samples and make adjustments for the type of respiratory protection required. All personnel in the regulated area shall not be allowed to eat, drink, smoke, chew tobacco or gum, apply cosmetics, or in any way interfere with the fit of their respirator. The following personnel shall have access to work area with the established respiratory protection:

1. The AOC/SOHB will provide a list of AOC employees, who are authorized access to the abatement area.
2. OSHA Inspectors.
3. EPA Inspectors.
4. DC Inspectors.
5. Approved Contractor personnel.

E. **Protective Clothing**: Provide boots, booties, hard hats, goggles, clothing, respirators and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA in 29 CFR 1910.132 (d). Provide all personnel entering the regulated area with disposable full body coveralls, disposable head covering, and 18 inch boot coverings. The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the project. Provide plastic/rubber disposable gloves for hand protection. Cloth type gloves may be worn under plastic/rubber gloves, but cannot be used alone. Duct tape shall be used to secure all suit sleeves to wrists and to secure foot coverings at the ankle. The contractor shall provide daily, five sets of protective clothing for use by visiting authorized personnel.

F. **Regulated Area Entry Procedure**: Worker protection shall meet the most stringent requirement. The Competent Person shall ensure that each time workers enter the regulated area, they remove ALL street clothes in the clean room of the decontamination unit and put on new disposable coveralls, head coverings, a clean respirator, and then proceed through the shower room to the equipment room where they put on non-disposable required personal protective equipment.

G. **Decontamination Procedure - PAPR**: The Competent Person shall require all personnel to adhere to following decontamination procedures whenever they leave the regulated area.

1. **When exiting** the regulated area, remove disposable coveralls, and ALL other clothes, disposable head coverings, and foot coverings or boots in the equipment room.
2. **Proceed to the** shower with respirator but without clothing or with bathing suit. Showering is MANDATORY. Care must be taken to follow reasonable procedures in removing the respirator to avoid damaging filters while showering. The following procedure is required as a minimum:

    a. **Thoroughly wet** body including hair and face. If using a PAPR, hold blower and battery above head to keep filters dry.
    b. **With respirator** still in place, thoroughly decontaminate body, hair, respirator face piece, and all other parts of the respirator except the blower and battery pack on a PAPR. Pay particular attention to cleaning the seal between the face and respirator face piece and under the respirator straps.
    c. **Take a deep breath**, hold it and/or exhale slowly, completely wetting hair, face, and respirator. While still holding breath, remove the respirator and hold it away from the face before starting to breathe.

3. **Carefully decontaminate** the face piece of the respirator inside and out. If using a PAPR, shut down using the following sequence: a) first cap inlets to filters; b) turn blower off to keep debris collected on the inlet side of the filter from dislodging and contaminating the outside of the unit; c) thoroughly decontaminate blower and hoses; d) decontaminate battery pack with a damp rag. (Note: THIS PROCEDURE IS NOT A SUBSTITUTE FOR RESPIRATOR CLEANING!).
4. **Shower and** wash body completely with soap and water. Rinse thoroughly.
5. **Rinse shower** room walls and floor to drain prior to exiting.
6. **Proceed from** shower to clean room; dry off and change into street clothes or into new disposable work clothing.

H. **Decontamination Procedure - Air Purifying, Negative Pressure Respirator**: The Competent Person shall require all personnel use the following decontamination procedures, as a minimum, whenever leaving the regulated area with a full face, HEPA filtered respirator:

1. **When exiting** the regulated area, remove disposable coveralls and ALL other clothes, disposable head coverings, and disposable foot coverings or boots in the equipment room.
2. **Still wearing** the respirator and completely naked, proceed to the shower, which is mandatory. Care must be taken to follow reasonable procedures in removing the respirator and filters to avoid asbestos fibers while showering. The following procedure is required, as a minimum:

    a. **Thoroughly wet** body from neck down. Wet hair as thoroughly as possible without wetting the respirator filter.
    b. **Take a deep** breath, hold it and/or exhale slowly, complete wetting of hair, thoroughly wetting face, respirator and filter(s). While still holding breath, remove respirator and hold it away from face before starting to breathe.

3. **Dispose of** wetted filters from respirator.
4. **Carefully decontaminate** respirator face piece and respirator inside and out. (NOTE: THIS IS NOT A SUBSTITUTE FOR RESPIRATOR CLEANING!).
5. **Shower and wash** body completely with soap and water. Rinse thoroughly.
6. **Rinse shower** room walls and floor to drain prior to exiting.
7. **Proceed from** shower room to clean room and change into street clothes or into new disposable work clothes.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT:

A. **General Requirements (All Abatements Projects):** All equipment, including protective clothing and respirators, used in the execution of this contract and provided to visitors to the site, shall be approved by the Project CIH and shall comply with ASTM E 849 and with the applicable Federal, State, and local regulations. Respirators shall conform to the OSHA requirements in 29 CFR 1910.134 and 29 CFR 1926.1101, except that single use and disposable respirators shall not be used. Type of respirators required shall be as specified by the Project CIH. If any air sampling indicates levels above 0.1 fibers per cubic centimeter or "too dirty to count", powered air or supplied air (type C) respirators shall be required during actual removal operations. Prior to the start of work, the abatement contractor shall provide and maintain a sufficient quantity of materials and equipment to assure continuous and efficient work throughout the duration of the project. Work shall not start unless the following items have been delivered to the site and the CIH has submitted verification to the AOC's representative to this effect.

1. **All materials** shall be delivered in their original package, container or bundle bearing the name of the manufacturer and the brand name (where applicable).
2. **Store all materials** subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Flammable materials cannot be stored inside buildings. Replacement materials shall be stored outside of the regulated/work area until abatement is completed.
3. **The Abatement Contractor** shall not block or hinder use of buildings by staff and visitors to the AOC in partially occupied buildings by placing materials/equipment in any unauthorized place.
4. **The Competent Person** shall inspect for damaged, deteriorating or previously used materials. Such materials shall not be used and shall be removed from the work site and disposed of properly.
5. **Polyethylene sheeting** for walls in the regulated area shall be a minimum of 6-mil thick. For floors and all other uses, sheeting of at least 6-mil thickness shall be used in widths selected to minimize the frequency of joints. Fire retardant poly shall be used throughout.
6. **The method of** attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and the AOC and selected to minimize damage to equipment and surfaces. Method of attachment may include any combination of moisture resistant duct tape or other waterproof tape, furring strips, spray glue, staples, nails, screws, lumber and plywood for enclosures or other effective procedures capable of sealing polyethylene to dissimilar

finished or unfinished surfaces under both wet and dry conditions (including the use of amended water).

7. **Polyethylene sheeting** utilized for personnel decontamination facility shall be opaque white or black in color, 6 mil fire retardant poly.
8. Installation and plumbing hardware, showers, hoses, drain pans, sump pumps and waste water filtration system shall be provided.
9. **An adequate number** of negative pressure units capable of providing a minimum of 4 air changes per hour in the regulated area while maintaining minus 0.02 inch water column shall be used. Two (2) additional negative pressure units shall be available to replace any malfunctioning unit.
10. **An adequate number** of HEPA vacuums, air sampling pumps and loaded filter cassettes, supplied air system, if used, providing Grade D breathing air with respirators and air lines sufficient for personnel, pressure differential gauge and recording capability shall be provided.
11. **An adequate number** of scrapers, sprayers, nylon brushes, brooms, disposable mops, rags, sponges, staple guns, shovels, ladders and scaffolding of suitable height and length as well as meeting OSHA requirements, fall protection devices, water hose to reach all areas in the regulated area, airless spray equipment, and any other tools, materials or equipment required to conduct the abatement project. All electrically operated hand tools, equipment, electric cords shall be equipped with ground-fault circuit protection.
12. **Special protection** for objects in the regulated area shall be detailed (e.g., plywood over carpeting or hardwood floors to prevent damage from scaffolds and falling material).
13. **6 mil disposal** bags for asbestos waste shall be pre-printed with labels and markings as required by OSHA, EPA.
14. **Impermeable asbestos** disposal drums shall be metal or fiberboard with locking ring tops with required OSHA, EPA and DOT labels and markings.
15. **The AOC shall be** provided a copy of the MSDS as required for all hazardous chemicals including encapsulants under OSHA 29 CFR 1910.1200 - Hazard Communication. Methylene chloride shall not be used with any spray adhesive or other product.
16. **DANGER signs**, as many and as required by OSHA 29 CFR 1926.1101(k)(7), shall be provided and placed by the Competent Person. All other posters and notices required by Federal and State regulations shall be posted in the Clean Room.
17. **Adequate respirators**, disposable protective clothing, hard hats, goggles, gloves and footwear for the project and number of personnel/shifts shall be provided. All personal protective equipment issued must be based on a hazard assessment conducted under 29 CFR 1910.132(d).

B. **Negative Pressure Filtration System**: The Abatement Contractor shall provide enough HEPA negative air machines to completely exchange the regulated area air volume 4 actual times per hour. The Competent Person shall determine the number of units needed for each regulated area by dividing the cubic feet in the regulated area by 15 and then dividing that result by the actual cubic feet per minute (cfm) for each unit to determine the number of units needed to effect 4 air changes per hour and maintain -.02 inches of negative pressure. Provide a standby units in the event of machine failure and/or emergency in an adjacent area.

C. **Negative Air Machines (HEPA Units)**

1. **Negative Air Machine Cabinet:** The cabinet shall be constructed of steel or other durable material capable of withstanding potential damage from rough handling and transportation. The width of the cabinet shall be less than 30 inches in order to fit in standard doorways. The cabinet must be factory sealed to prevent asbestos fibers from being released during use, transport, or maintenance. Any access to and replacement of filters shall be from the inlet end. The unit must be on casters or wheels.
2. **Negative Air Machine Fan:** The fan rating must provide the air-moving capacity under actual operating conditions. Manufacturer's typically use "free-air" (no resistance) conditions when rating fans. The fan must be a centrifugal type fan.
3. **Negative Air Machine Final Filter:** The final filter shall be a HEPA filter. The filter media must be completely sealed on all edges within a structurally rigid frame. The filter shall align with a continuous flexible gasket material in the negative air machine housing to form an air tight seal. Each HEPA filter shall be individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 mm dioctylphthalate (DOP) particles. Testing shall have been done in accordance with Military Standard MIL-STD-282 and Army Instruction Manual 136-300-175A. Each filter must bear a UL586 label to indicate ability to perform under specified conditions. Each filter shall be marked with the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
4. **Negative Air Machine Pre-filters:** The pre-filters, which protect the final HEPA filter by removing larger particles, are required to prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. A first stage pre-filter shall be a low efficiency type for particles 10 microns or larger. A second stage pre-filter shall have a medium efficiency effective for particles down to 5 microns or larger. Pre-filters shall be installed either on or in the intake grid of the unit and held in place with a special housing or clamps.
5. **Negative Air Machine Instrumentation:** Each unit must be equipped with a gauge to measure the pressure drop across the filters and to indicate when filters have become loaded and need to be changed. A table indicating the cfm for various pressure readings on the gauge shall be affixed near the gauge for reference or the reading shall indicate at what point the filters shall be changed, noting cfm delivery at that point. The unit must have an elapsed time meter to show total hours of operation.
6. **Negative Air Machine Safety and Warning Devices:** An electrical/ mechanical lockout must be provide to prevent the fan from being operated without a HEPA filter. Units must be equipped with an automatic shutdown device to stop the fan in the event of a rupture in the HEPA filter or blockage in the discharge of the fan. Warning lights are required to indicate normal operation; too high a pressure drop across filters; or too low of a pressure drop across filters.
7. **Negative Air Machine Electrical:** All electrical components shall be approved by the National Electrical Manufacturer's Association (NEMA) and Underwriter's Laboratories (UL). Each unit must be provided with overload protection and the motor, fan, fan housing, and cabinet must be grounded.

D. **HEPA Vacuums**

1. **All HEPA vacuums:** All electrical components shall be approved by the National Electrical Manufacturer's Association (NEMA) and Underwriter's Laboratories (UL). Each unit must be provided with overload protection and the motor and housing must be grounded.

B. **Testing of the HEPA Filtered vacuum HEPA filter:** The vacuum filter shall be a HEPA filter. The filter media must be completely sealed on all edges within a structurally rigid frame. The filter shall align with a continuous flexible gasket material in the HEPA vacuum housing to form an air tight seal. Each HEPA filtered vacuum shall be individually tested and certified to have an efficiency of not less than 99.97 percent when challenged with 0.3 mm dioctylphthalate (DOP) particles. Testing shall have been done in accordance with Military Standard MIL-STD-282 and Army Instruction Manual 136-300-175A. Each filter must bear a UL586 label to indicate ability to perform under specified conditions. Each filter shall be marked with the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.

2.2 ENCAPSULATING MATERIALS:

A. **Types of Encapsulant:** The following four types of encapsulant must comply with performance requirements as stated in "Performance Requirements":

1. Removal encapsulant - used as a wetting agent to remove ACM.
2. Bridging encapsulant - provides a tough, durable coating on ACM.
3. Penetrating encapsulant - penetrates/encapsulates ACM at least 13 mm (½").
4. Lock down encapsulant - seals microscopic fibers on surfaces after ACM removal.

B. **Performance Requirements:** Encapsulant shall meet the latest requirements of EPA; shall not contain toxic or hazardous substances; or solvents; and shall comply with the following performance requirements:

1. **General Requirements for all encapsulants:**

a. ASTM E84: Flame spread of 25; smoke emission of 50.
b. University of Pittsburgh Protocol: Combustion Toxicity; zero mortality.
c. ASTM C732: Accelerated Aging Test; Life Expectancy 20 years.
d. ASTM E96 Permeability: Minimum of 0.4 perms.

2. **Bridging/Penetrating Encapsulant:**

a. ASTM E736 Cohesion/Adhesion Test: 24 kPa (50 lbs/ft2).
b. ASTM E119 Fire Resistance: 3 hours (Classified by UL for use on fibrous or cementitious fireproofing).
c. ASTM D2794 Gardner Impact Test; Impact Resistance: Minimum 11.5 kg-mm (43 in/lb).
d. ASTM D522 Mandrel Bend Test; Flexibility: No rupture or cracking.

3. **Lock down Encapsulant:**

a. ASTM E119 Fire resistance: 3 hours (tested with fireproofing over encapsulant applied directly to steel member).
b. ASTM E736 Bond Strength: 48 kPa (100 lbs/sq. ft.) (test compatibility with cementitious and fibrous fireproofing).
c. In certain situations, encapsulant may have to be applied to hot pipes or equipment. The encapsulant shall be able to withstand high temperatures without cracking or off-gassing any noxious vapors during application.

4. **The Project CIH** shall review and recommend approval for all encapsulating materials used under this contract, prior to submitting them to Architect for review, and prior to their use on site. Encapsulating materials (sealants) shall meet the latest requirements of the Environmental Protection Agency (EPA) and shall possess the characteristics outlined in

paragraphs "Types of Encapsulant" and "Performance Requirements" above and the following:

a. **Adherence.** The sealant eliminates fiber dispersal by adhering to the fibrous substrate with sufficient penetration to prevent separation of the sealant from the sprayed asbestos material.
b. **Impact Penetration.** It withstands impact and penetration, protects the enclosed sprayed asbestos material, and it must not cause separation of sprayed asbestos material from its original substrate.
c. **Flexibility.** It possesses enough flexibility to accommodate atmospheric changes and settling of the structure over time.
d. **Resistance to Smoke and Flame.** It shall have high flame retardant characteristics and a low toxic fume and smoke emission rating.
e. **Ease of Application.** It must be easily applied with relative insensitivity to errors in preparation or application. Ease of repair by routine maintenance personnel is desirable.
f. **Toxicity.** The sealant must be neither noxious nor toxic to application workers and structure users thereafter.
g. **Permeability.** It should have some permeability to water vapor to prevent condensation accumulation be resistant to common cleaning agents.
h. **Stability.** It shall have suitable stability to weathering and aging.

C **Guarantee.** Guarantee encapsulating materials in accordance with Guarantee clause of the General Conditions.

PART 3 - EXECUTION

3.1 PREPARATION:

A. **Isolate the Work Area:** Place all tools, scaffolding, materials and equipment needed for working in the regulated area prior to erecting any plastic sheeting. Remove all uncontaminated removable furniture, equipment, and supplies from the regulated area before commencing work, or completely cover with two layers of 6-mil fire retardant poly sheeting and secure with duct tape. Lock out and tag out any HVAC systems in the regulated area. Seal off the perimeter to the regulated area to completely isolate the regulated area from adjacent spaces. All surfaces in the regulated area must be covered to prevent contamination and to facilitate clean-up. Should adjacent areas become contaminated, immediately stop work and clean up the contamination at no additional cost to the Government. Provide firestopping and identify all fire barrier penetrations.

B. **Critical Barriers**: Completely separate the regulated area from adjacent areas using fire retardant poly at least 6 mils thick and duct tape. Individually seal with two layers of 6 mil poly and duct tape all HVAC openings into the regulated area. Individually seal all lighting fixtures, clocks, doors, windows, convectors, speakers, or any other objects or openings in the regulated area. Use care with hot/warm surfaces.

C. **Primary Barriers:** Clean all furniture, equipment, etc., with HEPA vacuum and wet cleaning prior to being moved or covered. Clean all surfaces in the regulated area with the HEPA vacuum and wet wiping before installing poly sheeting. Cover the regulated area with two layers of 6 mil fire retardant poly on the floors and two layers of 6 mil fire retardant poly on the walls, unless otherwise directed in writing by the AOC's representative. Floor layers must form a right angle with the wall and turn up the wall at least 300 mm (12 inches). Seams must overlap at least 1800 mm (6 feet) and must be spray glued and taped. Install sheeting so that layers can be removed independently from each other. Mechanically support and seal with duct tape and glue all wall layers.

1. **Stairs and Ramps:** If stairs and ramps are covered with 6 mil plastic, two layers must be used. Provide 19 mm (3/4") exterior grade plywood treads held in place with duct tape/glue on the plastic. Do not cover rungs or rails with any isolation materials.
2. **Carpeted Floors:** Carpeting shall be covered with three layers of 6 mil poly. Corrugated cardboard sheets or a ridge material approved by the AOC must be placed between the top and middle layers of the poly.
3. **Elevators:** Any elevator walls, floor, and ceiling must be covered with 2 layers of 6 mil fire retardant poly. The elevator door must be in a positively pressurized area outside the clean room of the Decontamination unit. At completion of the abatement work, the elevator must be cleaned as per this section.

D. **Secondary Barriers**: A loose layer of 6 mil poly shall be used as a drop cloth to protect the primary layers from debris generated during the abatement. This layer shall be replaced at the end of each work shift or as needed during the work.

E. **Extension of the Regulated Area**: If the enclosure of the regulated area is breached in any way that could allow contamination to occur, the affected area shall be included in the regulated area and constructed as per this section. If the affected area cannot be added to the regulated area, decontamination measures must be started immediately and continue until air monitoring indicates levels outlined in "Asbestos Control Area" for outside the work area, above, are met.

F. **Firestop Requirements**: Through penetrations caused by cables, cable trays, pipes, sleeves must be firestopped with a fire-rated firestop system providing an air tight seal. Firestop materials that are not equal to the wall or ceiling penetrated shall be brought to the attention of the AOC Fire Protection Division. The contractor shall list all areas of penetration, the type of sealant used, and whether or not the location is fire rated. Any discovery of penetrations during abatement process shall immediately be brought to the attention of the AOC Fire Protection Division. All walls, floors and ceilings are considered fire rated unless otherwise determined by the AOC Fire Protection Division. Any visible openings whether or not caused by a penetration shall be reported by the contractor to the AOC Fire Protection Division for a sealant system determination. For firestops, contact the AOC Fire Protection Division for the opening size, penetration, and fire rating requirements.

G. **Pressure Differential**: The fully operational negative air system within the regulated area shall continuously maintain a pressure differential of minus 0.02 inch water column. Before any

disturbance of any asbestos material, this shall be demonstrated to the AOC by use of a pressure differential meter/manometer as required by OSHA 29 CFR 1926.1101(e)(5)(i). The Competent Person shall be responsible for providing and maintaining the negative pressure and air changes as required by OSHA and this specification. In any AOC-occupied building or facility, the abatement contractor is responsible for providing twenty four (24) hour, seven (7) days a week observation of the negative pressure air system once asbestos removal starts. This observation shall continue until final air clearance criteria are met. The suspension of this requirement can only be approved by the AOC/SOHB. Instructions to be followed during the observations will be outlined during the CIH pre-abatement coordination meeting specified in Part 1 above.

H. **Monitoring**: The pressure differential shall be continuously monitored and recorded between the regulated area and the area outside the regulated area with a monitoring device that incorporates a strip chart recorder. The strip chart recorder shall become part of the project log and shall indicate at least minus 0.02 inch water column for the duration of the project.

I. **Supplemental Make-up Air Inlets:** Provide, as needed for proper air flow in the regulated area, in a location approved by the Project CIH, by making openings in the plastic sheeting to allow outside air to flow into the regulated area. Auxiliary makeup air inlets must be located as far from the negative air machines as possible, off the floor near the ceiling, and away from the barriers that separate the regulated area from the occupied clean areas. Cover the inlets with weighted flaps which will seal in the event of failure of the negative pressure system. The flap must be sprayed with adhesive to assure sealing if it closes.

J. **Testing the System:** The negative pressure system must be tested before any ACM is disturbed in any way. After the regulated area has been completely prepared, the decontamination units set up, and the negative air machines installed, start the units up one at a time. Demonstrate the operation and testing of the negative pressure system to the AOC/SOHB using smoke tubes and a negative pressure gauge to document the negative pressure and air flow. Testing must also be done at the start of each work shift.

K. **Demonstration of the Negative Air Pressure System:** The demonstration of the operation of the negative pressure system to the AOC/SOHB shall include, but not be limited to, the following:

1. **Plastic barriers** and sheeting move lightly in toward the regulated area.
2. **Curtains of** the decontamination units move in toward regulated area.
3. **There is a** noticeable movement of air through the decontamination units. Use the smoke tube to demonstrate air movement from the clean room to the shower room to the equipment to the regulated area.
4. **Use smoke tubes** to demonstrate air is moving air across all areas in which work is to be done. Use a differential pressure gauge to indicate a negative pressure of at least 5.0 Pa (minus 0.02 inch) across every barrier separating the regulated area from the rest of the building. Modify the system as necessary to meet the above requirements.

L. **Use of the Negative Pressure System During Abatement Operations:**

1. **Start units before** beginning any disturbance of ACM occurs. After work begins, the units shall run continuously, maintaining a minimum of 4 actual air changes per hour at a negative pressure differential of 5.0 Pa (minus 0.02 inch) water column, for the duration of the work until a final visual clearance and final air clearance has been completed.
2. **The negative air** machines shall not be shut down at any time during the duration of the project unless it has been authorized by the AOC/SOHB.
3. **Abatement work shall** begin at a location farthest from the units and proceed toward them. If an electric failure occurs, the Competent Person shall stop all abatement work and immediately begin wetting all exposed asbestos materials for the duration of the power outage. Abatement work shall not resume until power is restored and all necessary units are operating properly again.
4. **The negative air** machines shall continue to run after all work is completed and until a final visual clearance and a final air clearance has been completed for that regulated area.

M. **Dismantling the System:** After completion of the final visual and final air clearance has been obtained, the units may be shut down. The units shall have been completely decontaminated, all pre-filters removed and disposed of as asbestos waste, and the unit inlet and outlet sealed with 2 layers of 6 mil poly.

N. **Before the work is begun**, clean all removable items and equipment. Remove them from the work area and store as directed.

O. **Cover all non-removable items** and equipment in the work area with six (6) mil flame retardant plastic sheeting taped securely in place.

P. **When specified,** remove all heating, ventilation, and air conditioning system filters, pack them in sealable double approved disposal bags or containers for disposal in the approved waste disposal site and replace them with new filters upon completion of abatement. Openings created by the removal of HVAC filters shall be sealed using 6 mil plastic sheeting taped securely in place, prior to start of work.

Q. **Post warning signs**: on the primary containment as required by 29 CFR 1910.1001, 29 CFR 1926.1101, ASTM E 849, as directed by District of Columbia Title 20 DCMR, Section 800 "Control of Asbestos" and as directed by the Architect.

R. **Obtain Approval of the Finished Primary Containment** from the Project CIH, prior to starting any actual asbestos removal work.

3.2 WORK PROCEDURE:

A. **General Procedures:** The enclosed work areas shall be defined as an asbestos regulated area and all asbestos worker protection and work practices not addressed in this specification shall be performed in conformance with the general safety and health provisions of 29 CFR 1910.1001, 29 CFR 1910.20, and the construction industry standard for asbestos, 29 CFR 1926.1101, respectively. The Project CIH shall review work area air samples and make adjustments for the

type of respiratory protection required. For asbestos abatement work, use general work practices, work practices for removal, and work practices for encapsulation as specified in 29 CFR 1926.1101. If a conflict arises, the more stringent application shall apply until a determination is made by the Architect.

B. **Protective Clothing:** Provide boots, booties, hard hats, goggles, clothing, respirators and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA at 29 CFR 1910.132 (d). Provide all personnel entering the regulated area with disposable full body coveralls, disposable head covering, and 18 inch boot coverings. The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the project. Provide plastic/rubber disposable gloves for hand protection. Cloth type gloves may be worn under plastic/rubber gloves, but cannot be used alone. Duct tape shall be used to secure all suit sleeves to wrists and to secure foot coverings at the ankle.

C. **Local Exhaust System:** Provide a local HEPA filtered exhaust system in the asbestos control area. The local HEPA filtered exhaust system shall exhaust to the outside of the building. Local HEPA filtered exhaust equipment must be sufficient to maintain a negative air pressure of 0.02 inch of water anywhere in the asbestos control area. In no case shall the building ventilation system be used as the local exhaust system for asbestos control. Filtering in vacuums and exhaust equipment shall be HEPA filtered equipped and conform to ANSI Z9.2; HEPA filters shall be used in all vacuums and exhaust equipment. NOTE: Approval from the AOC/SOHB is required for all local HEPA filtered exhaust systems that cannot be exhausted directly outside the building. To exhaust an HEPA filtered local exhaust system from an asbestos control area to the inside an AOC building will require the approval of the AOC/SOHB. The HEPA filtered exhaust equipment shall also pass a Dioctylphthalate (DOP) test for HEPA filtered equipment each time a containment that is to be exhausted into the building is erected.

D. **CONTROLLING ACCESS TO THE REGULATED AREA:** Access to the regulated area is allowed only through the personnel decontamination facility (PDF). All other means of access shall be eliminated and OSHA Danger asbestos signs posted as required by OSHA. If the regulated area is adjacent to or within view of an occupied area, provide a visual barrier of opaque fire retardant poly sheeting at least 6 mils thick to prevent building occupant observation. If the adjacent area is accessible to the public, the barrier must be solid and capable of withstanding the negative pressure.

E. **Coordination of Work of all Trades:** Coordinate the work of all trades to assure that their work is performed in accordance with the applicable regulations and that the asbestos control limits are maintained at all times both inside and outside the asbestos work area.

3.3 WET REMOVAL OF ACM OTHER THAN AMOSITE ASBESTOS

A. **Adequately and** thoroughly wet the ACM to be removed prior to removal to reduce/prevent fiber release to the air. Adequate time must be allowed for the amended water to saturate the ACM. Abatement personnel must not disturb dry ACM. Use a fine spray of amended water or removal encapsulant. Saturate the material sufficiently to wet to the substrate without causing excessive

dripping. The material must be sprayed repeatedly/continuously during the removal process in order to maintain adequately wet conditions. Removal encapsulant must be applied in accordance with the manufacturer's written instructions. Perforate or carefully separate, using wet methods, any outer covering that is painted or jacketed in order to allow penetration and wetting of the material. Where necessary, carefully remove covering while wetting to minimize fiber release. (Note: In no event shall dry removal occur except when a permit is granted for unavoidable safety hazards.)

B. **If ACM does** not wet well with amended water due to coating or jacketing, remove as follows:

1. **Mist work area** continuously with amended water whenever necessary to reduce airborne fiber levels.
2. **Remove saturated** ACM in small sections. Do not allow material to dry out. As material is removed, place the material, while still wet, into 6-mil poly asbestos waste bags. Twist tightly the bag neck, bend over (gooseneck) and seal with a minimum of three tight wraps of duct tape. Clean/decontaminate the outside of any residue and move to wash down station adjacent to EDF.
3. **Fireproofing or Architectural Finish on Scratch Coat:** Spray with a fine mist of amended water or removal encapsulant. Allow time for saturation to the substrate. Do not over saturate causing excess dripping. Scrape material from substrate. Remove material in manageable quantities and control falling to staging or floor. If the falling distance is over 20 feet (6M), use a drop chute to contain material through descent. Remove residue remaining on the scratch coat after scraping is done using a stiff bristle hand brush. If a removal encapsulant is used, remove residue completely before the encapsulant dries. Re-wet the substrate as needed to prevent drying before the residue is removed.
4. **Fireproofing or Architectural Finish on Wire Lath:** Spray with a fine mist of amended water or removal encapsulant. Allow time to completely saturate the material. Do not over saturate causing excess dripping. If the surface has been painted or otherwise coated, cut small holes as needed and apply amended water or removal encapsulant from above. Cut saturated wire lath into 2 by 6 feet (50 by 150 mm) sections and cut hanger wires. Roll up complete with ACM, cover in burlap and hand place in disposal bag. Do not drop to floor. After removal of lath/ACM, remove any over spray on decking and structure using stiff bristle nylon brushes. Depending on hardness of over spray, scrapers may be needed for removal.
5. **Pipe Insulation:** Remove the outer layer of wrap while spraying with amended water in order to saturate the ACM. Spray ACM with a fine mist of amended water or removal encapsulant. Allow time to saturate the material to the substrate. Cut bands holding pre-formed pipe insulation sections. Slit jacketing at the seams, remove and hand place in a disposal bag. Do not allow dropping to the floor. Remove molded fitting insulation/mud in large pieces and hand place in a disposal bag. Remove any residue on pipe or fitting with a stiff bristle nylon brush. In locations where pipe fitting insulation is removed from fibrous glass or other non-asbestos insulated straight runs of pipe, remove fibrous material at least 6 inches from the point it contacts the ACM.

3.4 WET REMOVAL OF AMOSITE ASBESTOS

A. **Amosite ACM** will require local exhaust ventilation and collection, as described below, in addition to wet removal. Provide specific description /locations/drawings.

B. **Provide local** exhaust ventilation and collection systems to assure collection of amosite fibers at the point of generation. A 12-inch flexible rigid non-collapsing duct shall be shall be located no more than 2 feet from any scraping/brushing activity. Primary filters must be replaced every 30 minutes on the negative air machines. Each scraping/brushing activity must have a negative air machine devoted to it. For pre-molded pipe insulation or cutting wire lathe, attach a 4-foot square flared end piece on the intake of the duct. Support the duct horizontally at a point 2 feet below the work to effect capture. One person in the crew shall be assigned to operate the duct collection system on a continual basis.

C. **Amosite asbestos** does not wet well with amended water. Submit full information and documentation on the wetting agent proposed prior to start for review by the AOC/SOHB representative. Insure that the material is worked on in small sections and is thoroughly and continuously wetted. Package immediately after removal while wet. Remove as required.

3.5 REMOVAL OF ACM/DIRT FLOORS AND OTHER SPECIAL PROCEDURES

A. **Major Abatement on Dirt Floors:** When working on dirt floors, pick up all chunks of visible asbestos debris using wet methods if possible after set-up of PDF, EDF, negative air systems as required. Perform work and decontaminate/clean-up; perform lock-down as needed and complete work as required under these specifications. The asbestos contaminated soil (ACS) shall be removed, encapsulated, and enclosed.

1. **Remove ACS** to a minimum depth of 2 inches. After wetting to minimize dust, shovel dirt into disposal bags. The Project CIH shall closely monitor work conditions and take appropriate action to protect workers from exposure to asbestos and heat stress. The minimum number of air changes per hour shall be six using negative air machines.
2. **The Contractor** has the option to encapsulate soil. A test area of a minimum of 100 sq. ft. must be performed to determine feasibility. Provide a written proposal for encapsulation to the AOC/SOHB representative with test results; recommendation from the manufacturer; a guarantee of performance for 10 years; and any limitations of application. The AOC reserves the right to accept or reject the application proposal with no effect on the contract. If approved, the application and supervision must be done by persons certified by the manufacturer as trained and experienced personnel as evidenced by documentation of such.
3. **Enclosure of ACM** using a concrete layer of 2 inches over the entire surface may also be done. Thoroughly dampen soil first before pouring concrete. Personnel shall be proficient in concrete laying as well as asbestos trained.

3.6 NEGATIVE PRESSURE GLOVEBAG METHOD OF ASBESTOS REMOVAL:

A. **General:** If specifically permitted, the glovebag method may be used for removing pipe insulation on a case by case basis. Approval from the AOC/SOHB, to use this method is required. The Project CIH will determine what personal decontamination procedures are required. Respiratory

protection and disposable clothing are required. Discard the clothing in accordance with paragraph Disposal of friable asbestos.

B. **Procedure:** Install the glovebag and negative pressure equipment following all procedures outlined in OSHA's 29 CFR 1926.1101.

C. **Removal and Disposal of Glovebags:** Removal of glovebags shall be in accordance with 29 CFR 1926.1101. Dispose of glovebags, material, and contaminated equipment in accordance with paragraph Disposal of Friable Asbestos.

3.7 SMALL SCALE SHORT DURATION PROJECTS - USE OF MINI-ENCLOSURE SYSTEM

A. **General:** If specifically permitted, a mini-enclosure system may be utilized for projects of short duration where there is less than three (3) square or three (3) linear feet of asbestos to be disturbed. A mini-enclosure system is defined as any portable system capable of performing small scale short duration projects equipped with all aspects of a full containment. This includes, but is not limited to the following components: negative air pressure, shower or water-tank facilities, HEPA vacuums, and polyethylene sheeting barriers. This work is best performed on flat ceiling surfaces, however it can be applied to horizontal wall surfaces. Use of this system is applicable to the following activities:

1. Access above asbestos containing lay-in ceilings
2. Wall channeling
3. Removal of light fixtures in plaster ceilings to access ceiling spaces
4. Changing light fixtures
5. Removal of ceiling tiles to access ceiling spaces
6. Impact or repair to asbestos ceiling plaster (e.g., hanging conduit or other such projects necessitating disturbance to the asbestos surfaces)
7. Removal of duct mastic
8. Removal of transite asbestos panel boards

B. **Procedure**: Utilize a negative pressure mini-enclosure system for this work. This process will follow all procedures outlined in OSHA's 29 CFR 1926.1101. The following steps are to be when performing this work:

1. **Preliminary setup:** Seal all critical barriers (e.g., doors, windows, vents) in the work area. Place OSHA warning signs as necessary facing outward on perimeter doors. Pre-clean area beneath work by wet wiping and HEPA vacuuming. Place drop cloth on surfaces below work and seal ir to floor with duct tape. Disconnect, as necessary, the electric and lock out power to breaker. Check and pressurize water within holding tanks, and nozzles on the enclosure system. Provide ground-fault protection for other outlets.
2. **Preliminary Inspection:** Project CIH will inspect area prior to commencement of work. Verify that all preliminary set-up procedures, as stated above, have been completed. Verify that all filters are properly positioned in HEPA vacuums and negative air machines (NAM).

Verify all equipment is operating properly. Review, with contractor, the CIH Approved Plan of Action specified in "Submittals" in Part 1 of this specification.

3. **Work Procedures:** Workers will don two (2) suits, gloves and appropriate respiratory protection in accordance with 29 CFR 1910.134. Workers will activate the negative air system associated with the mini-enclosure. The workers, in accordance with all applicable Federal and District of Columbia regulations, will perform necessary removal and/or encapsulation of asbestos containing material. Non-asbestos containing material to be salvaged, as stated in scheduled work plan, shall be properly decontaminated prior to its removal from the work area.
4. **Waste Removal:** All asbestos containing materials shall be sufficiently wet and placed in bags, drums, or other approved and labeled disposal containers. All waste disposal containers shall be properly decontaminated. Disposal shall be performed as specified in "Cleanup and Disposal" below.
5. **Decontamination Procedures:** Thoroughly clean via wet wiping and HEPA vacuuming all surfaces within the mini-enclosure so that no visible residue remains. Workers will decontaminate by HEPA vacuuming the outer protective suit. Workers will reinspect the area for visible residue, clean as necessary, then decontaminate the inner protective suit. Once entire area is completely decontaminated, the workers may remove and properly dispose of the second suit and shower. Once showered, the worker may exit the mini-enclosure system and remove respiratory protection. If a remote shower facility is utilized, the workers shall follow the same procedure as stated above, however, the second suit shall be removed upon entering the remote shower facility.
6. **Final Visual Inspection:** Once all work for the specified area has been completed and workers have exited the mini-enclosure system, the Project CIH will enter the enclosure system to perform a final visual inspection to insure that there is no visible residue and all work has been completed.
7. **Final Air Sample Clearance:** The following final clearance sampling procedure shall be followed for mini-enclosure systems. If the work area passes final visual inspection, a final clearance air sample shall be conducted by the Project CIH inside the mini-enclosure system. The clearance air sample will have a total volume of at least 1200 liters of air and shall be analyzed by Phase Contrast Microscopy (PCM) following the NIOSH 7400 method A rules. This sample shall be read on-site by the Project CIH. Upon failure of the clearance sample by PCM analysis, another sample shall be conducted and analyzed by Transmission Electron Microscopy (TEM) and submitted to an accredited laboratory with all extra cleaning and sampling at no cost to the Government.
8. **Post-Clearance:** Upon clearance of the mini-enclosure system both by visual and air sampling, the system can be used at another location, leaving the previous work area non-hazardous for other trades to perform routine work.

3.8 QUALITY CONTROL:

A. **Monitoring:** Monitoring of airborne concentrations of asbestos shall be in accordance with 29 CFR 1910.1001, 29 CFR 1926.1101, ASTM E 849, and this specification.

1. **Monitor the airborne concentration** of asbestos before constructing the containment work area, to obtain a baseline fiber concentration in the affected areas. If the baseline air monitoring results, exceeds 0.01 f/cc immediately notify the AOC/SOHB.
2. **Monitor continuously** during the course of the work inside the asbestos work area and other areas as directed by the Project CIH's air sampling strategy. In addition to that sampling strategy, and at a minimum, perform daily monitoring outside the entrance to the asbestos work area, along each perimeter wall of the containment and at the exhaust opening of the local exhaust system. If monitoring shows airborne concentrations greater than the asbestos control limits permitted by this specification, immediately stop all work, and notify the AOC/SOHB. Work shall not be restarted without approval of the Project CIH and the AOC/SOHB.
3. **In addition,** monitor the airborne concentrations of asbestos after final cleanup and removal of the enclosure of the asbestos control area in accordance with paragraph "Final Cleanup and Removal of Enclosures."

B. **Site Inspection and Stop Work Orders:** While performing asbestos abatement work, the Contractor shall be subject to on site inspection by agency officials or agency contracted inspection services. Work shall also be subject to inspection by OSHA and EPA inspectors and/or local building or health officials. If found to be in violation by one of these officials, the Contractor shall cease all work immediately. Until the violation is resolved, standby time required to resolve the violation shall be at the Contractor's expense. Five complete sets of equipment (such as respirators and disposable clothing) required for entry to the asbestos control area shall be available for inspectors use.

3.9 CLEANUP AND DISPOSAL:

A. **Permits and Notifications:** Secure necessary permits in conjunction with asbestos removal, hauling and disposition and provide timely notification of such actions, as may be required by Federal, state, regional, and local authorities. When required by regulation, ensure that notification to the Regional Office of the EPA and the responsible agency for the District of Columbia is made,; provide copies of the notification to the AOC/SOHB 20 days prior to the commencement of the work. Provide notification in accordance with 40 CFR 61.22(d)(1).

B. **Housekeeping:** Essential parts of asbestos dust control are housekeeping and cleanup procedures. All surfaces throughout the containment work area shall be maintained free of accumulations of asbestos fibers to prevent further dispersion. Give meticulous attention to restricting the spread of dust and debris, keep waste from being distributed over the general area. Use approved industrial vacuum cleaners with a HEPA filters to collect dust and small scrap. The use of compressed air is forbidden. Post appropriate asbestos hazard warning signs. At the end of each work shift, the containment area shall be cleaned. Equip personnel engaged in cleaning up asbestos scrap and waste with necessary respiratory equipment and protective clothing.

C. **Disposal of Friable Asbestos:** Collect and dispose of friable asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing which may produce airborne concentrations of asbestos fibers in disposal bags or containers approved as specified in Part 1

above for post-award submittals. Prior to placing in bags or containers, thoroughly wet down asbestos wastes to reduce airborne concentrations. All asbestos waste shall be double bagged, wrapped or contained in accordance with 40 CFR Subpart M. At the end of each work shift, all waste asbestos materials shall be removed from the containment. Obtain approval from the AOC/SOHB and affected AOC building Superintendent's office, when the removal of the containerized asbestos waste is scheduled from the containment area. The contractor shall make arrangements for the transportation and disposal of all asbestos waste generated under this specification in accordance with all Federal regulations at a sanitary landfill that meets EPA requirements. The Contractor will provide the AOC/SOHB with a copies of all Waste Shipment Records, hauler's receipts, and landfill receiving tickets resulting from the disposal of the asbestos waste as specified in Part 1 above for disposal receipt submittals. Establishment of any on-site temporary holding area for properly packaged asbestos waste must have prior approval from the AOC/SOHB. At no time shall the Contractor receive any asbestos-containing waste from other jobs, compliance inspectors or other sources without prior approval from the AOC/SOHB.

D. **Final Cleanup:** The Contractor shall notify the AOC/SOHB and the Project CIH that the work area is ready for final inspection. The Project CIH shall inspect the work area prior to performing final air sampling. Visual observation of asbestos materials, dust or debris is not permitted on any surface in or around the work area. Clean work area in accordance with EPA approved methods. Once the visual observation is satisfied apply a lock down encapsulant.

E. **Lock down encapsulation:** Lock down encapsulation is an integral part of the ACM removal. At the conclusion of ACM removal and before final air sampling, all surfaces shall be encapsulated with a lock down encapsulant. Apply two coats of encapsulant in strict accordance with the manufacturer's instructions. Any deviation from the instructions must be approved by the AOC's representative in writing prior to commencing the work. Apply the first coat of encapsulant with an airless sprayer at a pressure and using a nozzle orifice as recommended by the manufacturer. If the surface has been allowed to dry, wet wipe or HEPA vacuum prior to spraying with encapsulant. Apply a second coat over the first coat in strict conformance with the manufacturer's instructions. Color the encapsulant and contrast the color in the second coat so that visual confirmation of completeness and uniform coverage of each coat is possible. Adhere to the manufacturer's instructions for coloring. At the completion of the encapsulation, the surface must be a uniform third color produced by the mixture.

1. **Exposed Edges:** Seal edges of ACM exposed by removal work such as ACM left due to being outside the scope of work for this contract, or is inaccessible such as a sleeve or wall penetration, with one coat of penetrating encapsulant and one coat of bridging encapsulant. Prior to sealing, permit the exposed edges to dry completely in between the coats to permit penetration of the encapsulant.

F. **Final Air Sampling:** Perform air sampling for clearance purposes using a minimum of two (2) Transmission Electron Microscopy (TEM) air samples for each 2500 square feet of containment area. Repeat the decontamination and testing process until asbestos concentration levels are less than 0.01 s/cc (NIOSH 7402 method) or 70 S/mm^2 (AHERA). Copies of the TEM air sample results are to be faxed to the District of Columbia Department of Health, Air Quality Division.

G. **Removal of Enclosure:** If asbestos concentrations do not exceed 0.01 s/cc or 70 S/mm^2, contact the AOC/SOHB for authorization for the removal of the enclosure. Ensure that copies of the TEM air sample results are telefaxed to the District of Columbia Department of Health, Air Quality Division.

H. **Re-Occupancy Inspection:** The Contractor shall notify the AOC/SOHB and the Project CIH that the work area is ready for re-occupancy inspection. The Project CIH, shall inspect the work area after removal of the enclosure and shall ensure that no visible debris is observed. If visible debris is observed, the Contractor shall clean the work area as directed by the Project CIH, in accordance with EPA approved methods until no visible debris are observed. The Project CIH shall provide verbal re-occupancy approval to the AOC/SOHB immediately after this inspection. Documentation of the re-occupancy inspection shall be provided to the AOC/SOHB within 24 hours after approving an area for re-occupancy.

END OF SECTION 028233

SECTION 028333 - REMOVAL & DISPOSAL OF LEAD CONTAINING MATERIALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies abatement and disposal of lead containing products and controls needed to limit occupational and environmental exposure to lead hazards.

1.2 SCOPE OF WORK

A. **Scope and extent** of work shall be as defined in the Task Order.

1.3 APPLICABLE PUBLICATIONS

A. **The publications** listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

B. **CODE OF FEDERAL REGULATIONS (CFR):**

CFR 29 Part 1910	Occupational Safety and Health Standards
CFR 29 Part 1926	Safety and Health Regulations for Construction
CFR 40 Part 148	Hazardous Waste Injection Restrictions
CFR 40 Part 260	Hazardous Waste Management System: General
CFR 40 Part 261	Identification and Listing of Hazardous Waste
CFR 40 Part 262	Standards Applicable to Generators of Hazardous Waste
CFR 40 Part 263	Standards Applicable to Transporters of Hazardous Waste
CFR 40 Part 264	Standards for Owners and Operations of Hazardous Waste Treatment, Storage, and Disposal Facilities
CFR 40 Part 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
CFR 40 Part 268	Land Disposal Restrictions
CFR 49 Part 172	Hazardous Material Table, Special Provisions, Hazardous Material Communications, Emergency Response Information, and Training Requirements
CFR 49 Part 178	Specifications for Packaging

C. **National Fire Protection Association (NFPA):**

NFPA 701-1989	Methods of Fire Test for Flame-Resistant Textiles and Films

D. **National Institute For Occupational Safety And Health (NIOSH)**

NIOSH OSHA Booklet 3142 Lead in Construction

E. **Underwriters Laboratories(UL):**

UL 586-1990 High-Efficiency, Particulate, Air Filter Units

F. **American National Standards Institute:**

Z9.2-1979(R1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems.

G. **HUD's Guidelines For the Evaluation and Control of Lead - Based Paint Hazards in Housing**

1.4 **DEFINITIONS**

A. **Action Level**: Employee exposure, without regard to use of respirations, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period. As used in this section, 30 micrograms per cubic meter of air" refers to the action level.

B. **Area Monitoring**: Sampling of lead concentrations which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.

C. **Physical Boundary**: Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead control area."

D. **Certified Industrial Hygienist (CIH):** As used in this section, refers to an Industrial Hygienist employed by the contractor and is certified by the American Board of Industrial Hygiene in comprehensive practice.

E. **Change Rooms and Shower Facilities:** Rooms within the designated physical boundary around the lead control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross- contamination.

F. **Competent Person:** A person capable of identifying lead hazards in the work area and is authorized by the contractor to take corrective action.

G. **Decontamination Room:** Room for removal of contaminated personal protective equipment (PPE).

H. **Eight-Hour Time Weighted Average (TWA):** Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

I. **High Efficiency Particulate Air (HEPA) Filter Equipment:** HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint

dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.

J. **Lead:** Metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.

K. **Lead Control Area:** An enclosed area or structure with full negative pressure containment to prevent the spread of lead dust, paint chips, or debris of lead-containing material removal operations. The lead control area is isolated by physical boundaries to prevent unauthorized entry of personnel.

L. **Lead Permissible Exposure Limit (PEL):** Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following formula. PEL (micrograms/cubic meter of air) = 400/No. of hrs worked per day

M. **Personnel Monitoring:** Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 150 mm to 225 mm (6 to 9 inches) and the center at the nose or mouth of an employee.

N. **Architect or AOC:** The Architect of the Capitol.

1.5 QUALITY ASSURANCE

A. **Before exposure** to lead-contaminated dust, show evidence that workers have completed the comprehensive medical examination as required by 29 CFR 1926.62 (I) (1) (i) & (ii). The examination shall not be required if adequate records show that employees have been examined as required by 29 CFR 1926.62(i) within the last year.

B. **Medical Records:** Maintain complete and accurate medical records of employees in accordance with 29 CFR 1910.20.

C. **The Contractor** shall engage the services of an Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene (ABIH). Selection of the CIH is subject to approval of the Architect. The CIH will be responsible for, but not limited to the following:

1. **Certify** Training.
2. **Review, approve and submit** to the Architect's representative, all lead-containing material removal plan for conformance to the applicable referenced standards.
3. **Inspect and or oversee** the inspection of, all lead-containing material removal work for conformance with the approved plan.
4. **Develop** a monitoring plan and/or perform the monitoring. This is to include samples to test airborne levels of lead to determine exposure.
5. **Ensure work** is performed in strict accordance with specifications at all times.

6. **Ensure hazardous exposure** to personnel and to the environment are adequately controlled at all times.
7. **Visually inspect** all lead control areas for cleanliness and perform floor dust wipe testing.
8. **Review and approve** and submit to the Architect's representative, all sampling data within the time frames outlined in this specification.
9. **Review, approve and submit** to the Architect, the Contractor's lead compliance program in accordance with 29 CFR 1926.62(e)(2).

    a. The CIH may delegate the performance of his work, (except for the reviews and approval of plans, programs and sampling strategies), to Industrial Hygienist (IH) he selects, who are qualified by virtue of their training and work experiences to perform tasks. The CIH shall supervise the IH or all of the IH (s) and will be responsible for and review all results of their work. The selection of the CIH and the IH (s), is subject to approval of the Architect.

D. **Training:** Train each employee performing lead paint removal, lead containing material removal, disposal, and air sampling operations prior to the time of initial job assignment, in accordance with 29 CFR 1926.62.

E. **Training Certification:** The CIH shall certify all contractor employee Lead Training Certificates. These documents shall be submitted to the Architect as directed by section 1.6.D.6.c of this specification.

F. **Respiratory Protection Program:**

1. Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at intervals that are required by 29 CFR 1910.134.
2. The contractor shall establish and implement a respiratory protection program that has been approved and certified by the project CIH as required by 29 CFR 1910.134, 29 CFR 1910.1025, and 29 CFR 1926.62.

G. **Hazard Communication Program:** The contractor shall establish and implement a Hazard Communication program that has been approved and certified by the project CIH as required by 29 CFR 1910.1200. Once approved by the Architect and before any work starts, the contractor shall implement this plan.

I. **Safety and Health Compliance:**

1. **In addition** to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding removing, handling, storing, transporting, licensing and disposing of lead waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.62 and this specification. Submit matters regarding interpretation of standards to the Architect for resolution before starting work.

2. **Where specification** requirements and the referenced documents vary, the most stringent requirements shall apply.

J. **Pre-Construction Conference:** Ten (10) days before beginning any lead containing material removal, the CIH and removal contractor shall meet with the Architect's Occupational Health, Environmental, and Safety Office representative to discuss in detail the lead-containing paint and or material removal work plan. The topic of the Pre-Construction Conference shall include work procedures and precautions for the work plan.

K. **Supervision:** The competent person assigned to this operation by the contractor, shall be required to be onsite and supervising any and all work being performed inside the Lead Control area.

1.6 SUBMITTALS

A. **General:** No work involving the removal of lead containing materials shall begin until all submittal required by this specification are approved by the Architect.

B. **Hazardous Waste Management:**

1. **Submit a Hazardous Waste Management Plan** within 14 days after award of contract to the Architect for approval. The Hazardous Waste Management plan shall comply with applicable requirements of Federal, State, and local hazardous waste regulations and address:

   a. Procedures to segregate abatement wastes into separate waste streams to minimize the quantity of hazards waste generated.
   b. Testing to identify hazardous wastes associated with the work.
   c. Estimated quantities of wastes to be generated and disposed of.
   d. Transporter / disposal facility documentation including, name, location, EPA identification number, hazardous waste permits and a 24 hour point of contact.
   e. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.
   f. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.
   g. Spill prevention, containment, and cleanup contingency measures to be implemented.
   h. Procedures and schedule for waste containment, removal and disposal. Wastes shall be cleaned up and containerized daily.

2. **Obtain Architect's generator EPA** identification number from the Architect. Contact the Architect's Safety and Occupational Health Branch's representative for this information.

B. **Manufacturer's Catalog Data:**

1. HEPA Vacuums
2. Respirators

3. HEPA filtered negative air machines.
4. LBP Removal Chemicals.
5. All other tools or equipment that the contractor plans on using to remove Lead - Containing materials.

C. **Instructions:** Paint removal materials. Include applicable material safety data sheets.

D. **Statements Certifications and Statements:**

1. **Qualifications of CIH:** Submit to the Architect for approval the name, address, and telephone number of the CIH selected to perform responsibilities in paragraph entitled "CIH Responsibilities." Provide previous experience of the CIH on five (5) projects of comparable size, cost and complexity. Submit proper documentation that the Industrial Hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/re-certification.
2. **Qualifications of Competent Person:** Submit to the Architect for approval the name, address, and telephone number of the Competent Person assigned to supervise this operation. Provide all previous experience of the Competent Person related to Lead Abatement operations.
3. **Testing Laboratory:** Submit to the Architect for approval, the name, address, and telephone number of the testing laboratory selected to performing the analysis and reporting of airborne concentrations of lead wipes, and TCLP sampling. Provide proper documentation that persons performing the analysis have been judged proficient by successful participation within the last year in the American Industrial Hygiene Association (AIHA). Environmental Lead Proficiency Analytical Testing Program (ELPAT). The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA and ELPAT documentation along with date of accreditation / re-accreditation.
4. **Lead-Containing Material Removal Plan:** Ten (10) days before work starts, submit to the Architect for approval, a detailed job-specific plan, approved by the CIH, of work procedures to be used in the removal of lead-containing paint or materials. The plan shall include the name of the Competent Person assigned to supervise the operation, a sketch showing the location, size, and details of lead control areas, type of containment materials used, location and details of decontamination rooms, change rooms, shower facilities, and HEPA filtered mechanical ventilation system.

    a. *Include in the plan*, eating, drinking, smoking and restroom procedures, interface of trades, sequencing of lead related work, collected wastewater and lead paint and/or lead containing material debris disposal plan, air sampling plan, respirators, protective equipment, and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of 30 micrograms per cubic meter of air are not exceeded outside of the lead control area.
    b. *Include air and floor wipe sampling*, strategy, sampling methodology, frequency, duration of sampling, and qualifications and training of air monitoring personnel in the sampling portion on the plan.

5. **Field Test Reports:** Monitoring Results: Submit all monitoring results to the Architect's Occupational Health, Environmental, and Safety Office representative, by the next work day. All monitoring and floor wipe test results shall be signed by the testing laboratory, the employee performing the sampling, the employee that analyzed the sample, and the CIH. The quickest turn around time available, shall be used for all floor wipe tests, taken to clear a lead control area.
6. **Records:**

   a. Submit completed and signed hazardous waste manifest from treatment or disposal facility.
   b. Before work starts, submit to the Architect for approval, certification of Medical Examinations as required by 29 CFR 1926.62. The CIH shall certify that all employees, who will be engaged in lead - containing material removal operations, have been medically cleared as required by 29 CFR 1926.62.
   c. Before work starts, submit to the Architect for approval, certification of employee training certified by the CIH.
   d. Before work starts, submit to the Architect for approval, the CIH approved, the contractor's employee respiratory protection program.
   e. Before work starts, submit to the Architect for approval, certification of employees respirator fit testing certified by the CIH.
   f. Before work starts, submit to the Architect for approval, the CIH approved copy of the Hazard Communication Program as required by 29 CFR 1910.1200.
   g. Before work starts, submit to the Architect for approval, the Contractor's CIH approved lead compliance program in accordance with 29 CFR 1926.62(e)(2).

PART 2 - PRODUCTS

2.1 PAINT REMOVAL PRODUCTS:

A. **Submit for approval,** applicable Material Safety Data Sheets for paint removal products used in paint removal work. Use the least toxic product, suitable for the job and acceptable to the CIH.

PART 3 - EXECUTION

3.1 PROTECTION

A. **Notification:** Notify the Architect's Occupational Health, Environmental, and Safety Office representative 10 days prior to the start of any lead abatement work.

B. **Lead Control Area Requirements:**

1. **Establish a lead control area** by completely enclosing with 6 mil poly, where lead-containing material removal operations will be performed.

2. **Contain removal operations** by the use of a negative pressure full containment system with at least one change room and with HEPA filtered exhaust, exhausted to the outside of the building. The negative pressure containment, shall have a minimum of 6 air changes per hour. The contractor shall maintain a -0.020 column inches of water pressure differential, relative to outside pressure. This measurement shall be recorded and maintained within the enclosure as evidenced by manometric measurements and maintained around the clock, or until authorization for containment removal is obtained from the Architect. Hourly readings shall be recorded while lead removal work is being performed. Anytime the negative pressure is less than -0.020 column inches of water pressure differential, relative to outside pressure, all lead removal work inside the containment will stop. The work may be restarted only after the negative pressure is restored to a level of -0.020 column inches of water pressure differential or greater, relative to outside pressure.

C. **Protection of Existing Work to Remain:** Perform Lead - Containing Material removal work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, the contractor will restore it to its original condition.

D. **Boundary Requirements:** Provide physical boundaries around the lead control area by sealing off the area [As designated on the approved work plan] to ensure that airborne concentrations of lead will not reach 20 micrograms per cubic meter of air outside of the lead control area.

E. **Heating, Ventilating and Air Conditioning (HVAC) Systems:** Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead control areas. Seal intake and exhaust vents in the lead control area with 6-mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead control area.

F. **Change Room and Shower Facilities:** Provide clean change rooms and shower facilities within the physical boundary around the designated lead control area in accordance with requirements of 29 CFR 1926.62.

G. **Mechanical Ventilation System:**

1. **Use adequate ventilation** to control personnel exposure to lead in accordance with 29 CFR 1926.62.
2. **Contain removal operations** by the use of a negative pressure full containment system with at least one change room and with HEPA filtered exhaust, exhausted to the outside of the building. The negative pressure containment, shall have a minimum of 6 air changes per hour. The contractor shall maintain a -0.020 column inches of water pressure differential, relative to outside pressure. This measurement shall be recorded and maintained within the enclosure as evidenced by manometric measurements and maintained around the clock, or until authorization for containment removal is obtained from the Architect. Hourly readings shall be recorded while lead removal work is being performed. Anytime the negative pressure is less than -0.020 column inches of water pressure differential, relative to outside pressure, all lead removal work inside the containment will stop. The work may be restarted only after the negative pressure is restored to a level of -0.020 column inches of water pressure differential or greater, relative to outside pressure.

H. **Personnel Protection:** Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking is not permitted in the lead control area. The CIH shall initially select the appropriate respiratory protection to be used by the employees as required by 29 CFR 1926.62.

I. **Warning Signs:** Provide warning signs at approaches to lead control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

3.2 WORK PROCEDURES

A. **Perform removal of Lead-Containing Material** in accordance with approved Lead-Containing Material removal plan. The assigned Competent Person shall supervise the work and will be on site anytime work in the Lead Control area is on-going. This person shall use procedures and equipment required to limit occupational and environmental exposure to lead when Lead - Containing Material is removed in accordance with 29 CFR 1926.62, except as specified herein. Dispose of removed Lead-Containing Material, any paint chips and associated waste in compliance with Environmental Protection Agency (EPA), federal, state, and local requirements.

B. **Personnel Exiting Procedures:** Whenever personnel exist the lead-controlled area, they shall perform the following procedures and shall not leave the work until:

1. **Vacuum** themselves off.
2. **Remove protective clothing** in the decontamination room, and place them in an approved impermeable disposal bag.
3. **Shower.**
4. **Change** to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.

C. **Monitoring:** Monitoring of airborne concentrations of lead shall be in accordance with 29 CFR 1926.62 and as specified herein. Air monitoring, testing, and reporting shall be performed by a CIH or an Industrial Hygiene (IH) Technician who is under the direction of the CIH.

1. **The CIH or the IH Technician** under the direction of the CIH shall be on the job site directing the monitoring, and inspecting the Lead - Containing Material removal work to ensure that the requirements of this specification have been satisfied during the entire Lead - Containing Material removal operation.
2. **Personal air monitoring samples** shall be taken on employees who are anticipated to have the greatest risk of exposure as determined by the CIH.
3. **Submit results of air monitoring samples**, signed by the CIH, by the next work day after the air samples are taken. Notify the Architect immediately of exposure to lead at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area.

D. **Monitoring During Lead-Containing Material Removal Work:**

1. **Perform personal and area monitoring** during the entire Lead-Containing Material removal operation. Sufficient area monitoring shall be conducted at the physical boundary outside the lead control area to ensure unprotected personnel are not exposed above 20 micrograms per cubic meter of air.

   a. If the outside boundary lead levels are at or exceed 20 micrograms per cubic meter of air, work shall be stopped and the CIH shall notify the Architect immediately.

      1) The CIH shall immediately investigate, perform necessary air and/or wipe sampling and render a decision as whether these areas are contaminated are not. The findings of the investigation and the results of any samples taken, shall be reported to the Architect immediately.
      2) If the area investigated by the CIH is found to be contaminated with lead, the following procedures shall be followed:

         a) Work in all lead containment operations shall remain halted.
         b) The contractor shall decontaminate (clean up) the contaminated area.
         c) The CIH shall determine the source and cause of the contamination, along with the necessary corrective measures to be taken.
         d) The contractor shall decontaminate the contaminated area using the corrective measures outlined by the CIH.
         e) The CIH shall visually inspect the "contractor cleaned" contaminated area and perform floor wipe tests. The number of floor wipe tests will be determined by the CIH. Results of the floor wipe tests shall be less than 100 $\mu g/ft^2$. The CIH shall submit copies of all sample results along with a certification that the area is no longer contaminated with lead.
         f) If on the second try, the contractor is unable to achieve a floor wipe sample result of less than 100 $\mu g/ft^2$ for a particular area, the following procedures shall be followed:

            1. The CIH shall render a decision as to what clearance level would be achievable for that particular area.
            2. The CIH shall submit to the Architect this decision, along with copies of the sampling data for area, along with a certification that the area is no longer contaminated with lead.

         g) The Architect will issue the authority to restart work in the lead control area, once the CIH certifies to the Architect, that the contaminated area has been successfully decontaminated.

2. **The CIH** shall review the sampling data collected on that day to determine if condition(s) requires any further change in work methods. Removal work shall resume when approval is given by the Architect.
3. **The Contractor** shall control the lead level outside of the work boundary to less than 30 micrograms per cubic meter of air at all times. As a minimum, conduct area

monitoring daily on each shift in which Lead - Containing Material removal operations are performed in areas immediately adjacent to the lead control area. If any outside the work boundary lead levels are at or exceed 30 micrograms per cubic meter of air, work shall be stopped and the CIH shall immediately correct the condition(s) causing the increased levels and notify the Architect immediately. Removal work shall resume when approval is given by the Architect.

3.3 LEAD-CONTAINING MATERIAL REMOVAL

A. **Remove Lead - Containing Material** within the areas designated on the approved Lead - Containing Material removal plan in order to completely expose the substrate. Take whatever precautions are necessary to minimize damage to the underlying substrate.

B. **Indoor Lead-Containing Material Removal:** Select Lead - Containing Material removal processes to minimize contamination of work areas with lead-contaminated dust or other lead-contaminated debris/waste. This Lead - Containing Material removal process shall be described in the Lead - Containing Material removal plan approved by the Architect.

C. **After beginning the Lead-Containing Material** removal operation or at the direction of the Architect, the following procedures shall be followed, concerning all reports of possible lead contamination in occupied spaces, within a building that has a Lead Control area:

1. **The CIH** shall immediately investigate, perform necessary air and/or wipe sampling and render a decision as whether these areas are contaminated and develop a corrective plan of action. The findings of the investigation and the results of any samples taken, shall be reported to the Architect immediately.
2. **If the area investigated** by the CIH is found to be contaminated with lead, the following procedures shall be followed:

   a. *Work* in all lead containment operations shall be halted.
   b. *The contractor* shall initiate the corrective plan of action plan developed by the CIH in order to decontaminate the area.
   c. *The CIH* shall determine the source and cause of the contamination, along with the necessary corrective measures to be taken to prevent a reoccurrence.
   d. *Before* any lead abatement work is restarted, the CIH must certify to the Architect, that the source and cause of the contamination has been corrected. Work may restart once approval from the Architect is received.
   e. *The CIH* shall visually inspect the "contractor cleaned" contaminated area and perform floor wipe tests. The number of floor wipe tests will be determined by the CIH. Results of the floor wipe tests shall be less than 100 $\mu g/ft^2$. The CIH shall submit copies of all sample results along with a certification that the area is no longer contaminated with lead.
   f. *If on the second try*, the contractor is unable to achieve a floor wipe sample result of less than 100 $\mu g/ft^2$ for a particular area, the following procedures shall be followed:

1) The CIH shall render a decision as to what clearance level would be achievable for that particular area.
2) The CIH shall submit to the Architect this decision, along with copies of the sampling data for area, along with a certification that the area is no longer contaminated with lead.

3.5 CLEANUP AND DISPOSAL:

A. **Cleanup:** Maintain surfaces of the lead control area free of accumulations of Lead - Containing Material chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the Lead - Containing Material removal operation has been completed, clean the area of all visible Lead - Containing Material contamination, dust and debris by vacuuming with a HEPA filtered vacuum cleaner and wet wipe and or mopping the area.

B. **Certification:** The CIH shall certify in writing the following:

1. **The inside and outside** of each lead control area air monitoring samples are less than 30 micrograms per cubic meter of air.
2. **The respiratory protection** for the employees was adequate and the work procedures were performed in accordance with 29 CFR 1926.62 and this specification, and that there were no visible accumulations of lead-contaminated Lead - Containing Material and dust on the work site.
3. **The CIH** shall perform floor wipe test(s) by using methodology that is outlined in HUD's Guidelines for the Evaluation and Control of Lead - Based Paint hazards in Housing. A Lead Control area is considered complete if all floor wipe sample results are below 100µg/ft². Do not remove the lead control area or roped-off boundary and warning signs prior to the Architect's approval and receipt of the CIH's certification.
4. **Re-clean and re-sample** any Lead Control area showing dust or residual Lead - Containing Material (chips) or floor wipe sample results that are above 100µg/ft².
5. **If after the second attempt**, the contractor is unable to achieve a floor wipe sample result of less than 100 g/ft² for a particular lead control area, the following procedures shall be followed:

   a. The CIH shall render a decision as to what clearance level would be achievable for that particular control area.
   b. The CIH shall submit to the Architect this decision, along with copies of the sampling data for containment removal approval.
   c. The Architect may have the CIH's decision reviewed by a third party CIH.

C. **Testing of Lead-Containing Material Residue:** Where indicated or when directed by the Architect, test all potential Lead - Containing waste by following the Toxicity Characteristic Leaching Procedure (TCLP) for lead in accordance with 40 CFR 261.

D. **Disposal:**

1. **Collect** all potential lead-contaminated waste, including but not limited to, removed paint chips, abrasive blast medium, architectural components, scrap, debris, bags, containers, equipment, and lead-contaminated clothing.
2. **For drummed waste,** store in U.S. Department of Transportation (49 CFR 178) approved 55-gallon drums to identify the type of waste (49 CFR 172) and the date lead contaminated wastes were first put into the drum.
   For architectural components, e.g., doors, windows, and molding, store so as to prevent environmental contamination. Six - mil plastic sheeting should be placed underneath and on top of the material; plywood or other durable material should be placed on top of the plastic to prevent it from being punctured. Transport waste in covered vehicle only.
3. **Periodically remove hazardous wastes** so that 90 calendar day storage limitation is not exceeded.
4. **Handle, store, transport, and dispose** lead or lead-contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Comply with land disposal restriction notification requirements as required by 40 CFR 268.
5. **Disposal Documentation:** Submit written evidence that the hazardous waste transporter and the treatment, storage, or disposal facility (TSDF) is approved for lead disposal by the EPA and state or local regulatory agencies. Submit one copy of the completed manifest, signed and dated by the initial transporter in accordance with 40 CFR 262. Submit Certification of disposal from TSDF.

END OF SECTION 028333

SECTION 028334 - REMOVAL & DISPOSAL OF EXTERIOR LEAD MATERIALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. **This section** specifies abatement and disposal of exterior lead containing products and controls needed to limit occupational and environmental exposure to lead hazards.

1.2 SCOPE OF WORK

A. **Contractor Abatement Program:** Submit for approval, a lead Compliance Program, in accordance with OSHA's, 29 CFR 1926.62, paragraph (e)(2)(i) & (ii)(A thru I). OSHA requires all employers, who's employees will be working with lead containing materials, establish and implement a compliance program prior to the commencement of the job. This written compliance program shall address all provisions listed in 29 CFR 1926.62, Lead, paragraph (e)(2)(ii), subparagraphs (A thru I). The Contractor's program shall that include specific details regarding to following subjects:

1. Details that shows, how the work will be performed.
2. Details that shows, how the work platforms, the surrounding grounds and building is to be protected while the lead-based paint is being scraped.
3. Details of how protection for the building occupants and interior areas while lead based paint is being scraped.
4. Details showing how the lead paint debris is collected and stored for disposal.
5. Details showing who will perform the EPA test for waste classification on the lead-based paint chips collected as a result of the window frames being scraped. This test classifies the lead paint chips for disposal and determines what type of disposal procedures to use.
6. Details that outline required worker PPE.
7. Details that outline OSHA required personal air sampling for workers.
8. Details that shows periodic sampling of the building interior while lead based paint is being scraped.

1.3 REGULATORY REQUIREMENTS

A. **Safety and Health Compliance:** In addition to the detailed requirements herein, comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding removing, handling, storing, transporting, licensing and disposing of lead paint and lead waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.62 and these requirements. Submit matters regarding interpretation of standards to the Architect for resolution before starting work.

1. Where any requirements and referenced documents vary, the most stringent requirements shall apply.

B. **Licenses and Permits:** Contractors disturbing Lead paint for the Architect of the Capitol in the District of Columbia are required to be licensed and obtain a permit, to do Lead work in the District of Columbia. The Contractor shall comply with the District of Columbia's lead law 11-221 "Lead-Based Paint Abatement and Control Act of 1996".

Department of Health
Environmental Health Administration
Lead poisoning Prevention Division
51 N Street NE, 3rd Floor
Washington, DC 20002
Phone 202-535-1934

1.4 **SUBMITTALS:**

A. **Testing Laboratory:** Submit to the Architect for approval, the name, address, and telephone number of the testing laboratory selected to performing the analysis and reporting Toxicity Characteristic Leachate Procedure (TCLP) sampling results. Provide proper documentation that persons collecting the TCLP samples and persons performing the analysis have been judged proficient by successful participation within the last year in the American Industrial Hygiene Association (AIHA). Environmental Lead Proficiency Analytical Testing Program (ELPAT). The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA and ELPAT documentation along with date of accreditation / re-accreditation.

B. **Competent Person:** Submit to the Architect for approval the name, address, and telephone number of the Competent Person assigned to supervise this operation. Provide all previous experience of the Competent Person related to Lead Abatement operations.

C. **Paint Removal Products:** Submit for approval, applicable Material Safety Data Sheets for any paint removal products. Use the least toxic product, suitable for the job and acceptable to the AOC.

D. **Training:** Show proof that each employee performing lead paint removal, lead containing material removal, disposal, and air sampling operations prior to the time of initial job assignment, have been trained in accordance with 29 CFR 1926.62. Submit copies of all contractor employee Lead Training Certificates.

PART 2 - PRODUCTS

2.1 **EQUIPMENT**

A. **Respiratory Protection Program:** Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at intervals that are required by 29 CFR 1910.134. The contractor shall establish and implement a respiratory protection program as required by 29 CFR 1910.134, 29 CFR 1910.1025, and 29 CFR 1926.62 and provide the Architect with a copy for review.

PART 3 - EXECUTION

3.1 PREPARATION

A. **Notification:** Notify the Architect's Safety and Occupational Health Branch representative, and the affected Building Superintendent, 10 weekdays days prior to the start of any lead paint scraping operations.

B. **Pre-Construction Conference:** Ten (10) days before beginning any lead containing material removal, the CIH and removal contractor shall meet with the Architect's Occupational Health, Environmental, and Safety Office representative to discuss in detail the lead-containing paint and or material removal work plan. The topic of the Pre-Construction Conference shall include work procedures and precautions for the work plan.

C. **Protection of Existing Work to Remain:** Perform scraping of Lead-Containing Paint work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, the contractor will restore it to its original condition.

D. **Hazard Communication Program:** The contractor shall establish and implement a Hazard Communication program that has been approved by the Architect as required by 29 CFR 1910.1200. Once approved by the Architect and before any work starts, the contractor shall implement this plan.

3.2 EXECUTION

A. **Supervision:** The competent person assigned to this operation by the contractor, shall be required to be onsite and supervising any and all work being performed inside the Lead Control area.

B. **Abatement:** After beginning the Lead-Containing Paint scraping operation, or at the direction of the Architect, the following procedures shall be followed concerning all reports of possible lead contamination in occupied spaces:

1. **A Certified Industrial Hygienist (CIH)**, shall immediately (within 2 hours of notification) investigate, perform necessary air and/or wipe sampling and render a decision as whether these areas are contaminated and develop a corrective plan of action. The findings of the investigation and the results of any samples taken, shall be reported to the Architect immediately (within 12 hours).
2. **If the area** investigated by the CIH is found to be contaminated with lead, the following procedures will be initiated:

    a. *All work* and all paint scraping operations shall be halted.
    b. *The contractor* shall initiate the corrective plan of action developed by the CIH in order to decontaminate the area.
    c. *The CIH* shall determine the source and cause of the contamination, along with the necessary corrective measures to be taken to prevent a reoccurrence.

d. *Before any lead paint scraping work* is restarted, the CIH must certify to the Architect, that the source and cause of the contamination has been corrected. Work may restart once approval from the Architect is received.

e. *The CIH* shall visually inspect the "contractor cleaned" contaminated area and render a decision as to what type of clearance sampling is required and what clearance level would be achievable for that particular area. The CIH shall submit to the Architect this decision, along with copies of the sampling data for area and a certification that the area is no longer contaminated with lead.

B. **Disposal:** Collect all potential lead-contaminated waste, including but not limited to, removed paint chips, abrasive blast medium, architectural components, scrap, debris, bags, containers, equipment, and lead-contaminated clothing.

1. **For drummed waste**, store in U.S. Department of Transportation (49 CFR 178) approved 55-gallon drums to identify the type of waste (49 CFR 172) and the date lead contaminated wastes were first put into the drum.
2. **For architectural components,** e.g., doors, windows, and molding, store so as to prevent environmental contamination. Six - mil plastic sheeting should be placed underneath and on top of the material; plywood or other durable material should be placed on top of the plastic to prevent it from being punctured. Transport waste in covered vehicle only.
3. **Periodically remove** hazardous wastes so that 90 calendar day storage limitation is not exceeded.
4. **Handle, store, transport, and dispose** lead or lead-contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Comply with land disposal restriction notification requirements as required by 40 CFR 268.
5. **Disposal Documentation:** Submit written evidence that the hazardous waste transporter and the treatment, storage, or disposal facility (TSDF) is approved for lead disposal by the EPA and state or local regulatory agencies. Submit one copy of the completed manifest, signed and dated by the initial transporter in accordance with 40 CFR 262. Submit Certification of disposal from TSDF.

3.3 FIELD TESTS

A. **Testing of Lead-Containing Lead-Containing Material Residue:** Where indicated or when directed by the Architect, test all potential Lead-Containing waste by following the Toxicity Characteristic Leaching Procedure (TCLP) for lead in accordance with 40 CFR 261.

B. **Occupied Areas:** After beginning the Lead-Containing Paint scraping operation, or at the direction of the Architect, the following procedures shall be followed concerning all reports of possible lead contamination in occupied spaces:

1. **A Certified Industrial Hygienist** (CIH), shall immediately (within 2 hours of notification) investigate, perform necessary air and/or wipe sampling and render a decision as whether these areas are contaminated and develop a corrective plan of action. The findings of the investigation and the results of any samples taken, shall be reported to the Architect immediately (within 12 hours).

2. **If the area investigated** by the CIH is found to be contaminated with lead, the following procedures will be initiated:

   a. *All work* and all paint scraping operations shall be halted.
   b. *The contractor* shall initiate the corrective plan of action developed by the CIH in order to decontaminate the area.
   c. *The CIH* shall determine the source and cause of the contamination, along with the necessary corrective measures to be taken to prevent a reoccurrence.
   d. *Before any lead paint scraping work* is restarted, the CIH must certify to the Architect, that the source and cause of the contamination has been corrected. Work may restart once approval from the Architect is received.
   e. *The CIH* shall visually inspect the "contractor cleaned" contaminated area and render a decision as to what type of clearance sampling is required and what clearance level would be achievable for that particular area. The CIH shall submit to the Architect this decision, along with copies of the sampling data for area and a certification that the area is no longer contaminated with lead.

END OF SECTION 028334

DIVISION THREE - CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Division** specifies cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes, for noncritical applications of concrete and for projects using small quantities of concrete.

B. **Related Sections may** include the following as prepared on a project-specific basis:

1. Division 31 Section "Earthwork" for drainage fill under slabs-on-grade.
2. Division 32 Section "Cement Concrete Pavement" for concrete pavement and walks.
3. Division 32 Section "Decorative Cement Concrete Pavement" for decorative concrete pavement and walks.
4. Division 32 Section "Exposed Aggregate Concrete," for designated concrete pavement and walks.

1.3 SUBMITTALS

A. **General:** In addition to the following, comply with submittal requirements in ACI 301.

B. **Product Data:** For each type of product indicated.

C **Design Mixtures:** For each concrete mixture.

1.4 QUALITY ASSURANCE

A. **Manufacturer Qualifications:** A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B **Source Limitations:** Obtain each type of cement of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

C. **Standards:** Comply with ACI 301, "Specification for Structural Concrete," including the following sections, unless modified by requirements in the Contract Documents:

1. "General Requirements."
2. "Formwork and Formwork Accessories."
3. "Reinforcement and Reinforcement Supports."
4. "Concrete Mixtures."
5. "Handling, Placing, and Constructing."

B. **Comply with ACI 117**, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 - PRODUCTS

2.1 FORMWORK

A. **Furnish formwork** and formwork accessories according to ACI 301.

2.2 STEEL REINFORCEMENT

A. **Reinforcing Bars:** ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. **Plain-Steel Wire:** ASTM A 82, as drawn.

C. **Plain-Steel Welded Wire Reinforcement:** ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

D. **Deformed-Steel Welded Wire Reinforcement:** ASTM A 497, flat sheet.

2.3 CONCRETE MATERIALS

A. **Cementitious Material:** Use the following cementitious materials, of the same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, Type I or IA.

B. **Normal-Weight Aggregate:** ASTM C 33, graded, 1-1/2-inch (38-mm) nominal maximum aggregate size.

C. **Lightweight Aggregate:** ASTM C 330, 1-inch (25-mm) nominal maximum aggregate size.

D. **Water:** ASTM C 1602/C 1602M; potable.

E. **Synthetic Fiber:** Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.

2.4 ADMIXTURES

A. **Air-Entraining Admixture:** ASTM C 260.

B. **Chemical Admixtures:** Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 RELATED MATERIALS

A. **Vapor Retarder:** Multi-ply reinforced polyethylene sheet, ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.

B. **Joint-Filler Strips:** ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

C. **Water Stops:** Self-expanding of butyl rubber with sodium bentonite or other hydro phille polymers.

2.6 CURING MATERIALS

A. **Evaporation Retarder:** Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

B. **Absorptive Cover:** AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. **Moisture-Retaining Cover:** ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. **Water:** Potable.

E. **Clear, Waterborne, Membrane-Forming Curing Compound:** ASTM C 309, Type 1, Class B.

F. **Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:** ASTM C 1315, Type 1, Class A.

2.7 CONCRETE MIXTURES

A. **Comply** with ACI 301 requirements for concrete mixtures.

B. **Normal-Weight Concrete:** Prepare design mixes, proportioned according to ACI 301, as follows:

1. Minimum Compressive Strength: See Drawings.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 5 inches (125 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.

C. **Synthetic Fiber:** Uniformly disperse in concrete mix at manufacturer's recommended rate but not less than a rate of 1.0 lb/cu. yd. (0.60 kg/cu. m).

2.8 CONCRETE MIXING

A. **Ready-Mixed Concrete:** Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.

1. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. **Project-Site Mixing:** Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. **Design,** construct, erect, brace, and maintain formwork according to ACI 301.

3.2 VAPOR RETARDERS

A. **Install, protect, and repair** vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended adhesive or joint tape.

3.3 STEEL REINFORCEMENT

A. **Comply with ACI 301** for fabricating, placing, and supporting reinforcement. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.4 JOINTS

A. **General:** Construct joints true to line with faces perpendicular to surface plane of concrete.

B. **Construction Joints:** Locate and install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. **Contraction Joints in Slabs-on-Grade:** Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. **Grooved Joints:** Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
2. **Sawed Joints:** Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Sawing shall begin no later than a half hour after completion of finishing operations.

D. **Isolation Joints:** Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. **Extend joint fillers** full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.5 CONCRETE PLACEMENT

A. **Comply** with ACI 301 for measuring, batching, mixing, transporting, and placing concrete.

B. **Before test sampling** and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

C. **Do not add water** to concrete during delivery, at Project site, or during placement.

D. **Consolidate concrete** with mechanical vibrating equipment.

3.6 FINISHING FORMED SURFACES

A. **Rough-Formed Finish:** As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding 1/2 inch (13 mm).

1. Apply to concrete surfaces not exposed to public view after completion of construction.

B. **Smooth-Formed Finish:** As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm).

1. Apply to concrete surfaces indicated to receive a rubbed finish.

C. **Rubbed Finish:** Apply the following rubbed finish, defined in ACI 301, to smooth-formed finished as-cast concrete where indicated: Smooth-rubbed finish.

D. **Related Unformed Surfaces:** At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.7 FINISHING UNFORMED SURFACES

A. **General:** Comply with ACI 301 for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Apply finishes selected from below and as indicated on approved project drawings:

B. **Screed surfaces** with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface. Do not further disturb surfaces before starting finishing operations.

C. **Scratch Finish:** Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.

D. **Float Finish:** Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. **Trowel Finish:** Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces

exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. **Trowel and Fine-Broom Finish:** Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. **Nonslip Broom Finish:** Apply a nonslip broom finish to surfaces indicated. Immediately after float finishing, slightly roughen surface by brooming with fiber-bristle broom.

3.8 CONCRETE PROTECTING AND CURING

A. **General:** Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 301 for cold-weather protection and with for hot-weather protection during curing.

B. **Evaporation Retarder:** Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. **Begin curing** after finishing concrete but not before free water has disappeared from concrete surface.

D. **Curing Methods:** Cure formed and unformed concrete for at least seven days by one or a combination of the methods listed below. Obtain AOC approval prior to use of curing compounds or curing and sealing compounds on interior spaces or spaces to receive finish applications:

1. **Moisture Curing:** Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water, or
   b. Continuous water-fog spray, or
   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. **Moisture-Retaining-Cover Curing:** Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. **Curing Compound:** Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Re-coat areas subjected to heavy

rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

4. **Curing and Sealing Compound:** Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Re-coat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.9 FIELD QUALITY CONTROL

A. **Testing Agency:** Engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

B. **Tests:** Perform according to ACI 301. One composite sample shall be obtained for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m) but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.

3.10 REPAIRS

A. **Remove and replace concrete** that does not comply with requirements in this Section.

END OF DIVISION THREE

DIVISION FOUR - MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes unit masonry assemblies consisting of the following:

1. Concrete masonry units (CMUs).
2. Pre-faced concrete masonry units.
3. Concrete brick.
4. Face brick.
5. Building (common) brick.
6. Structural-clay facing tile.
7. Mortar and grout.
8. Reinforcing steel.
9. Masonry joint reinforcement.
10. Ties and anchors.
11. Embedded flashing.
12. Miscellaneous masonry accessories.
13. Masonry-cell insulation.
14. Cavity-wall insulation.

B. **Related Work** in other sections:

1. Masonry Veneer construction - See project-specific specifications prepared under individual Task Orders.
2. Composite masonry - See project-specific specifications prepared under individual Task Orders.
3 Reinforced Unit Masonry Installation - See project-specific specifications prepared under individual Task Orders.
4. Stone masonry - See project-specific specifications prepared under individual Task Orders.

1.3 DEFINITIONS

A. **Reinforced Masonry:** Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. **Provide structural unit masonry** that develops indicated net-area compressive strengths (f'_m) at 28 days.

1.5 SUBMITTALS

A. **Product Data:** For each type of product indicated.

B. **Shop Drawings:** For the following:

1. **Masonry Units:** Show sizes, profiles, coursing, and locations of special shapes.
2. **Stone Trim Units:** Show sizes, profiles, and locations of each stone trim unit required.
3. **Reinforcing Steel:** Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
4. **Fabricated Flashing:** Detail corner units, end-dam units, and other special applications.

C. **Samples for Initial Selection:** For the following:

1. Face brick, in the form of straps of five or more bricks.
2. Colored mortar.
3. Weep holes/vents.

D. **Samples for Verification:** For each type and color of the following:

1. Exposed concrete masonry units.
2. Face brick, in the form of straps of five or more bricks.
3. Special brick shapes.
4. Glazed structural-clay tile.
5. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
6. Stone trim.
7. Weep holes/vents.

E. **List of Materials Used in Constructing Mockups:** List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

F. **Material Certificates:** Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:

1. **Masonry units:** Include material test reports substantiating compliance with requirements. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances. For exposed brick, include material test report for

efflorescence according to ASTM C 67. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

2. **Cementitious materials:** Include brand, type, and name of manufacturer.
3. **Pre-blended, dry mortar mixes:** Include description of type and proportions of ingredients.
4. **Grout mixes:** Include description of type and proportions of ingredients.
5. **Reinforcing bars.**
6. **Joint reinforcement.**
7. **Anchors,** ties, and metal accessories.

G. **Mix Designs:** For each type of mortar and grout. Include description of type and proportions of ingredients.

1. **Include test reports**, per ASTM C 780, for mortar mixes required to comply with property specification.
2. **Include test reports**, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

H. **Statement of Compressive Strength of Masonry:** For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

I. **Cold-Weather Procedures:** Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.6 QUALITY ASSURANCE

A. **Testing Agency Qualifications:** An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.

B. **Source Limitations for Masonry Units:** Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. **Source Limitations for Mortar Materials:** Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

D. **Preconstruction Testing Service:** AOC will engage a qualified independent testing agency, as required, to perform preconstruction testing indicated below. Payment for these services will be made by AOC. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

1. **Clay Masonry Unit Test:** For each type of unit required, per ASTM C 67.

2. **Concrete Masonry Unit Test:** For each type of unit required, per ASTM C 140.
3. **Mortar Test (Property Specification):** For each mix required, per ASTM C 780.
4. **Grout Test (Compressive Strength):** For each mix required, per ASTM C 1019.

E. **Fire-Resistance Ratings:** Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

F. **Mockups:** Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of typical wall area as shown on Drawings.
2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
4. Protect accepted mockups from the elements with weather-resistant membrane.
5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. **Pre-installation Conference:** Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE, AND HANDLING

A. **Store masonry units** on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. **Store cementitious materials** on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. **Store aggregates** where grading and other required characteristics can be maintained and contamination avoided.

D. **Deliver pre-blended**, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

E. **Store masonry accessories**, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS

A. **Protection of Masonry:** During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. **Extend cover** a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.
2. **Where 1 wythe** of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe and hold cover in place.

B. **Do not apply uniform floor** or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. **Stain Prevention:** Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. **Protect base** of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. **Protect sills**, ledges, and projections from mortar droppings.
3. **Protect surfaces** of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. **Turn scaffold boards** near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. **Cold-Weather Requirements:** Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. **Cold-Weather Cleaning:** Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. **Hot-Weather Requirements:** Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. **Defective Units:** Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the

standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.2 CONCRETE MASONRY UNITS (CMUs)

A. **Shapes:** Provide shapes indicated and as follows:

1. **Provide special shapes** for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. **Provide bullnose units** for outside interior corners, unless otherwise indicated.

B. **Concrete Masonry Units:** ASTM C 90.

1. **Unit Compressive Strength:** Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa).
2. **Weight Classification:** Normal weight, unless otherwise indicated.
3. **Size (Width):** Manufactured to dimensions 3/8 inch less than nominal dimensions.
4. **Exposed Faces:** Provide color and texture matching the range represented by Architect's sample.
5. **Faces to Receive Plaster:** Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

C. **Concrete Building Brick:** ASTM C 55.

1. **Unit Compressive Strength:** Provide units with minimum average net-area compressive strength of 2500 psi (17.3 MPa).
2. **Weight Classification:** Normal weight.
3. **Size (Actual Dimensions):** 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.

2.3 CONCRETE AND MASONRY LINTELS

A. **General:** Provide either concrete or masonry lintels, at Contractor's option, complying with requirements below.

B. **Concrete Lintels:** Precast units made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars indicated or required to support loads indicated. Cure precast lintels by same method used for concrete masonry units.

C. **Concrete Lintels:** Precast or formed-in-place concrete lintels complying with requirements in Division 03 Article "Cast-in-Place Concrete."

D. **Masonry Lintels:** Prefabricated or built-in-place masonry lintels made from bond beam concrete masonry units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels

until cured.

2.4 BRICK

A. **General:** Provide shapes indicated and as follows:

1. **For ends of sills** and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. **Provide special shapes** for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. **Provide special shapes** for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. **Provide special shapes** for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. **Face Brick:** ASTM C 216, Grade SW, Type FBS, unless otherwise indicated..

1. **Unit Compressive Strength:** Provide units with minimum average net-area compressive strength of 4400 psi (30.3 MPa) or as indicated on the project documents.
2. **Initial Rate of Absorption:** Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
3. **Efflorescence:** Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. **Surface Coating:** Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet (3 m).
5. **Size (Actual Dimensions):** 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long].
6. **Application:** Use where brick is exposed, unless otherwise indicated.
7. **Color and Texture:** As selected by AOC. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.

C. **Building (Common) Brick:** ASTM C 62, Grade MW or SW.

1. **Unit Compressive Strength:** Provide units with minimum average net-area compressive strength of 3000 psi (20.7 MPa) or as indicated on the project documents.
2. **Size:** Match size of face brick.
3. **Application:** Use where brick is indicated for concealed locations. Face brick complying with requirements for grade, compressive strength, and size indicated for building brick may be substituted for building brick.

2.5 STRUCTURAL-CLAY FACING TILE

A. **General:**

1. **Provide solid**, multi-cored, or hollow units, with shape and direction of cores optional, unless otherwise indicated.
2. **Provide multi-cored units** designed for use in reinforced, grouted masonry; either with vertical cores and with webs notched to receive horizontal reinforcement, or with horizontal cores and with holes in bed shells for placement of grout and to receive vertical reinforcement.
3. **Where indicated** for exterior applications, provide units recommended by manufacturer for exterior use in Project's location.
4. **Where direct application** of plaster is indicated or where bonded to backup masonry, provide units with rough, combed, or scored faces.
5. **Provide special shapes** where required for corners, jambs, coved bases, sills, and other special conditions indicated, including applications that cannot be produced by sawing standard units.

    a. Provide bullnose units for outside corners, unless otherwise indicated.
    b. Provide coved internal corners.
    c. Provide recessed, coved base units.

B. **Glazed Structural-Clay Facing Tile:** ASTM C 126, Grade S (Select). Series as indicated for the project, size and type in conformance with the following:

1. **Sizes:** 6T Series with actual face dimensions of 5-1/6 inches (131 mm) high by 11-3/4 inches (298 mm) long by widths indicated.
2. **Sizes:** 8W Series with actual face dimensions of 7-3/4 inches (197 mm) high by 15-3/4 inches (400 mm) long by widths indicated.
3. **Sizes:** 4W Series with actual face dimensions of 7-3/4 inches (197 mm) high by 7-3/4 inches (197 mm) long by 3-3/4 inches (95 mm) wide.
4. **Provide Type I** (single-faced units) where only one finished face is exposed when units are installed, and Type II (double-faced units) where two opposite finished faces are exposed when units are installed.
5. **Provide special units** glazed on ends and tops, as well as faces for corners, jambs, sills, pilasters, columns, and other applications indicated, where glazed units are exposed on other surfaces and faces.
6. **Colors and Patterns:** As selected by AOC from manufacturer's full range.

2.6 MORTAR AND GROUT MATERIALS

A. **Portland Cement:** ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. **Hydrated Lime:** ASTM C 207, Type S.

C. **Portland Cement-Lime Mix:** Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.

D. **Mortar Cement:** ASTM C 1329.

E. **Mortar Pigments:** Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

F. **Colored Cement Product:** Packaged blend made from portland cement and lime masonry cement or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
2. Pigments shall not exceed 10 percent of portland cement by weight.
3. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.

G. **Aggregate for Mortar:** ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

H. **Aggregate for Grout:** ASTM C 404.

I. **Epoxy Pointing Mortar:** ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for structural-clay tile facing units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's colors.

J. **Refractory Mortar Mix:** Ground fireclay or non-water-soluble, calcium aluminate, medium-duty refractory mortar that passes ASTM C 199 test; or an equivalent product acceptable to authorities having jurisdiction.

K. **Cold-Weather Admixture:** Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

L. **Water-Repellent Admixture:** Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.

M. **Water:** Potable.

2.7 REINFORCEMENT

A. **Uncoated Steel Reinforcing Bars:** ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

B. **Masonry Joint Reinforcement, General:** ASTM A 951.

1. **Interior Walls:** Mill-galvanized, carbon steel.
2. **Exterior Walls:** Hot-dip galvanized, carbon steel.
3. **Wire Size for Side Rods:** W2.8 or 0.188-inch (4.8-mm) diameter, or as indicated on the drawings..
4. **Wire Size for Cross Rods:** W1.7 or 0.148-inch (3.8-mm) diameter, or as indicated on the drawings.
5. **Wire Size for Veneer Ties:** W2.8 or 0.188-inch (4.8-mm) diameter.
6. **Spacing of Cross Rods, Tabs, and Cross Ties:** Not more than 16 inches (407 mm) o.c.
7. **Provide in lengths** of not less than 10 feet (3 m), with prefabricated corner and tee units.

C. **Masonry Joint Reinforcement for Single-Wythe Masonry:** Either ladder or truss type with single pair of side rods.

D. **Masonry Joint Reinforcement for Multi-wythe Masonry:**

1. **Ladder type** with 1 side rod at each face shell of hollow masonry units more than 4 inches (100 mm) in width, plus 1 side rod at each wythe of masonry 4 inches (100 mm) or less in width, or
2. **Tab type**, either ladder or truss design, with 1 side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face, or as indicated on the drawings.

2.8 TIES AND ANCHORS

A. **Materials:** Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.

1. **Mill-Galvanized, Carbon-Steel Wire:** ASTM A 82; with ASTM A 641/A 641M, Class 1 coating.
2. **Hot-Dip Galvanized, Carbon-Steel Wire:** ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
3. **Stainless-Steel Wire:** ASTM A 580/A 580M, Type 304.
4. **Galvanized Steel Sheet:** ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.
5. **Steel Sheet, Galvanized after Fabrication:** ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
6. **Stainless-Steel Sheet:** ASTM A 666, Type 304.

7. **Steel Plates, Shapes, and Bars:** ASTM A 36/A 36M.
8. **Stainless Steel bars:** ASTM A 276 or ASTM a 666, Type 304.

B. **Corrugated Metal Ties:** Metal strips not less than 7/8 inch (22 mm) wide with corrugations having a wavelength of 0.3 to 0.5 inch (7.6 to 12.7 mm) and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) made from steel sheet, galvanized after fabrication or stainless-steel sheet not less than 0.053 inch (1.3 mm) thick. Ties made from galvanized steel sheet may be used in interior walls, unless otherwise indicated.

C. **Wire Ties, General:** Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.

D. **Individual Wire Ties:** Rectangular units with closed ends and not less than 4 inches (100 mm) wide.

1. **Z-shaped ties** with ends bent 90 degrees to provide hooks not less than 2 inches (50 mm) long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
2. **Where wythes do not align**, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches (32 mm).
3. **Wire:** Fabricate from 1/4-inch- (6.4-mm-) diameter, hot-dip galvanized steel or stainless-steel wire. Mill-galvanized wire ties may be used in interior walls, unless otherwise indicated.

E. **Adjustable Anchors for Connecting to Structure:** Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. **Anchor Section for Welding to Steel Frame:** Crimped 1/4-inch- (6.4-mm-) diameter, hot-dip galvanized steel or stainless-steel wire.
2. **Tie Section for Steel Frame:** Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch- (6.4-mm-) diameter, hot-dip galvanized steel or stainless-steel wire.
3. **Connector Section for Concrete:** Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.097-inch- (2.5-mm-) thick, steel sheet, galvanized after fabrication.
4. **Tie Section for Concrete:** Corrugated metal ties with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch (25 mm) of masonry face.

F. **Partition Top anchors:** 0.097-inch- (2.5-mm-) thick metal plate with 3/8-inch- (10-mm-) diameter metal rod 6 inches (150 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication or stainless steel.

G. **Rigid Anchors:** Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.4 mm)

thick by 24 inches (600 mm) long, with ends turned up 2 inches (50 mm) or with cross pins, unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

H. **Stone Anchors:** Fabricate dowels, cramps, and other stone anchors from stainless steel.

2.9 MISCELLANEOUS ANCHORS

A. **Unit Type Inserts in Concrete:** Cast-iron or malleable-iron wedge-type inserts.

B. **Dovetail Slots in Concrete:** Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.034-inch (0.9-mm), galvanized steel sheet.

C. **Anchor Bolts:** L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

D. **Postinstalled Anchors:** Provide chemical or torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. **Corrosion Protection:** Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Alloy Group 1 or 4) for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.

2.10 EMBEDDED FLASHING MATERIALS

A. **Metal Flashing:** Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. **Stainless Steel:** ASTM A 240/A 240M, Type 304, 0.016 inch (0.4 mm) thick.
2. **Copper:** ASTM B 370, Temper H00 or H01, cold-rolled copper sheet, 10-oz./sq. ft. (3-kg/sq. m) weight or 0.0135 inch (0.34 mm) thick for fully concealed flashing; 16-oz./sq. ft. (5-kg/sq. m) weight or 0.0216 inch (0.55 mm) thick elsewhere.
3. **Fabricate continuous flashings** in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.6 m). Provide splice plates at joints of formed, smooth metal flashing.
4. **Fabricate through-wall metal flashing** embedded in masonry from stainless steel or copper (as indicated), with ribs at 3-inch (75-mm) intervals along length of flashing to provide an integral mortar bond.

5. **Fabricate through-wall flashing** with snaplock receiver on exterior face where indicated to receive counter-flashing.
6. **Fabricate through-wall flashing** with sealant stop where indicated. Fabricate by bending metal back on itself 3/4 inch (19 mm) at exterior face of wall and down into joint 3/8 inch (10 mm) to form a stop for retaining sealant backer rod.
7. **Metal Drip Edges:** Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
8. **Metal Flashing Terminations:** Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 3/8 inch (10 mm) to form a stop for retaining sealant backer rod.
9. **Metal Expansion-Joint Strips:** Fabricate from stainless steel or copper (as indicated) to shapes indicated.

B. **Flexible Flashing:** For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:

1. **Copper-Laminated Flashing:** 7-oz./sq. ft. (2-kg/sq. m) copper sheet bonded with asphalt between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
2. **Asphalt-Coated Copper Flashing:** 7-oz./sq. ft. (2-kg/sq. m) copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
3. **Elastomeric Thermoplastic Flashing:** Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy as follows:

   a. *Monolithic Sheet:* Elastomeric thermoplastic flashing, 0.040 inch (1.0 mm) thick.
   b. *Self-Adhesive Sheet:* Elastomeric thermoplastic flashing, 0.025 inch (0.6 mm) thick, with a 0.015-inch- (0.4-mm-) thick coating of rubberized-asphalt adhesive.
   c. *Accessories:* Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

4. **EPDM Flashing:** Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637, 0.040 inch (1.0 mm) thick.

C. **Single-Wythe CMU Flashing System:** System of CMU cell flashing pans and interlocking CMU web covers made from high-density polyethylene incorporating chemical stabilizers that prevent UV degradation. Cell flashing pans have integral weep spouts that are designed to be built into mortar bed joints and weep collected moisture to the exterior of CMU walls and that extend into the cell to prevent clogging with mortar.

D. **Solder and Sealants for Sheet Metal Flashings:** As specified in Division 07 Article "Sheet Metal Flashing and Trim."

1. **Solder for Stainless Steel:** ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.

2. **Solder for Copper:** ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
3. **Elastomeric Sealant:** ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. **Adhesives, Primers, and Seam Tapes for Flashings:** Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.11 MISCELLANEOUS MASONRY ACCESSORIES

A. **Compressible Filler:** Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.

B. **Preformed Control-Joint Gaskets:** Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. **Bond-Breaker Strips:** Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. **Weep/Vent Products:** Use one of the following, unless otherwise indicated:

1. **Wicking Material:** Absorbent rope, made from cotton, 1/4 to 3/8 inch (6 to 10 mm) in diameter, in length required to produce 2-inch (50-mm) exposure on exterior and 18 inches (450 mm) in cavity between wythes. Use only for weeps.
2. **Cellular Plastic Weep/Vent:** One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard.
3. **Mesh Weep/Vent:** Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe; in color selected from manufacturer's standard.
4. **Vinyl Weep Hole/Vent:** One-piece, offset, T-shaped units made from flexible, injection-molded PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in color approved by AOC to match that of mortar.

E. **Cavity Drainage Material:** Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

F. **Reinforcing Bar Positioners:** Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch (3.6-mm) steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.

2.12 MASONRY-CELL INSULATION

A. **Loose-Granular Fill Insulation:** Perlite complying with ASTM C 549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

B. **Molded-Polystyrene Insulation Units:** Rigid, cellular thermal insulation formed by the expansion of polystyrene-resin beads or granules in a closed mold to comply with ASTM C 578, Type I. Provide specially shaped units designed for installing in cores of masonry units.

2.13 MORTAR AND GROUT MIXES

A. **General:** Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
3. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement, mortar cement, and lime.
4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. **Pre-blended, Dry Mortar Mix:** Furnish dry mortar ingredients in form of a pre-blended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. **Mortar for Unit Masonry:** Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

1. For masonry below grade or in contact with earth, use Type S.
2. For reinforced masonry, use Type S.
3. For mortar parge coats, use Type N.
4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
5. For interior non-load-bearing partitions, Type O may be used instead of Type N.

D. **Colored-Aggregate Mortar:** Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

1. Mix to match AOC's sample.

E. **Grout for Unit Masonry:** Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. **Examine conditions**, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. For the record, prepare written report, endorsed by Installer, listing any conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.

B. **Before installation**, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

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

3.2 INSTALLATION, GENERAL

A. **Thickness:** Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. **Build chases and recesses** to accommodate items specified in this and other Sections.

C. **Leave openings for equipment** to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. **Use full-size units** without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, un-chipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. **Select and arrange units** for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

F. **Matching Existing Masonry:** Match coursing, bonding, color, and texture of existing masonry.

G. **Wetting of Brick:** Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

H. **Comply** with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

1. **For conspicuous vertical lines**, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
2. **For vertical alignment** of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
3. **For conspicuous horizontal lines**, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. **For exposed bed joints**, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm). Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
5. **For exposed head joints**, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).
6. **For faces** of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.
7. **For exposed bed joints** and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.3 LAYING MASONRY WALLS

A. **Lay out walls** in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

1. **Bond Pattern for Exposed Masonry:** Unless otherwise indicated, lay exposed masonry in bond to match adjoining or existing work indicated to remain or bond pattern indicated on Drawings; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
2. **Lay concealed masonry** with all units in a wythe in running bond or bonded by lapping not less than 4 inches (100-mm). Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

B. **Stopping and Resuming Work:** Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

C. **Built-in Work:** As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

D. **Fill space** between steel frames and masonry solidly with mortar, unless otherwise indicated.

E. **Where built-in items** are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

F. **Fill cores** in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

G. **Build non-load-bearing** interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.

1. **Install compressible filler** in joint between top of partition and underside of structure above.
2. **Fasten partition top anchors** to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c., unless otherwise indicated.
3. **Wedge** non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. **At fire-rated partitions**, treat joint between top of partition and underside of structure above to comply with Division 07 Article "Fire-Resistive Joint Systems."

3.4 MORTAR BEDDING AND JOINTING

A. **Lay hollow concrete masonry units** as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. **Lay solid masonry units** with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. **Lay structural-clay tile** as follows:

1. **Lay vertical-cell units** with full head joints, unless otherwise indicated. Provide bed joints with full mortar coverage on face shells and webs.
2. **Lay horizontal-cell units** with full bed joints, unless otherwise indicated. Keep drainage channels, if any, free of mortar. Form head joints with sufficient mortar so excess will be squeezed out as units are placed in position. Butter both sides of units to be placed, or butter one side of unit already in place and one side of unit to be placed.
3. **Maintain joint thicknesses** indicated except for minor variations required to maintain bond alignment. If not indicated, lay walls with 1/4- to 3/8-inch- (6- to 10-mm-) thick joints.
4. **Where** epoxy-mortar pointed joints are indicated, rake out setting mortar to a uniform depth of 1/4 inch (6 mm) and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.

D. **Set stone or cast-stone** trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Allow cleaned surfaces to dry before setting.
3. Wet joint surfaces thoroughly before applying mortar.

E. **Tool exposed joints** slightly concave when thumb-print hard, using a jointer larger than joint thickness, unless otherwise indicated. For glazed masonry units, use a nonmetallic jointer 3/4 inch (19 mm) or more in width.

F. **Cut joints flush** for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.5 CAVITY WALLS

A. **Bond wythes of cavity walls** together using one of the following methods (as indicated in the specific project documents):

1. **Individual Metal Ties:** Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. (0.25 sq. m) of wall area spaced not to exceed 24 (610 mm) o.c. horizontally and 16 inches (406 mm) o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.

   a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
   b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.

2. **Masonry Joint Reinforcement:** Installed in horizontal mortar joints.

   a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
   b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.
   c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.

3. **Header Bonding:** Provide masonry unit headers extending not less than 3 inches (76 mm) into each wythe. Space headers not over 8 inches (203 mm) clear horizontally and 16 inches (406 mm) clear vertically.

B. **Bond wythes** of cavity walls together using bonding system indicated on Drawings.

C. **Keep cavities clean** of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

D. **Parge cavity face** of backup wythe in a single coat approximately 3/8 inch (10 mm) thick. Trowel face of parge coat smooth.

E. **Installing Cavity-Wall Insulation:** Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.6 MASONRY-CELL INSULATION

A. **Where indicated**, pour granular insulation into cavities to fill void spaces. Maintain inspection ports to show presence of insulation at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of insulation to 1 story in height, but not more than 20 feet (6 m).

3.7 MASONRY JOINT REINFORCEMENT

A. **General:** Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).

   1. Space reinforcement not more than 16 inches (406 mm) o.c.

2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings.

    a. *Reinforcement* above is in addition to continuous reinforcement.

B. **Interrupt joint reinforcement** at control and expansion joints, unless otherwise indicated.
C. **Provide continuity** at wall intersections by using prefabricated T-shaped units.

D. **Provide continuity** at corners by using prefabricated L-shaped units.

E. **Cut and bend reinforcing units** as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. **Anchor masonry** to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1/2 inch (13 mm) in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.9 CONTROL AND EXPANSION JOINTS

A. **General:** Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. **Form control joints** in concrete masonry using one of the following methods:

1. Install preformed control-joint gaskets designed to fit standard sash block, or
2. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant, or
3. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. **Form expansion joints** in brick made from clay or shale as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches (100 mm) in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
2. Build flanges of factory-fabricated, expansion-joint units into masonry.
3. Build in compressible joint fillers where indicated.
4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."

D. **Provide horizontal**, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch (10 mm).

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.10 LINTELS

A. **Install steel lintels** where indicated.

B. **Provide concrete or masonry lintels** where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.

C. **Provide minimum bearing** of 8 inches (200 mm) at each jamb, unless otherwise indicated.

3.11 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. **General:** Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. **Install flashing** as follows, unless otherwise indicated:

1. **Prepare masonry surfaces** so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. **At multiwythe masonry walls**, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches (100 mm), and 1-1/2 inches (38 mm) into the inner wythe. Form 1/4-inch (6-mm) hook in edge of flashing embedded in inner wythe.
3. **At lintels and shelf angles**, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
4. **Interlock end joints** of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with

elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.

5. **Install metal drip edges** and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
6. **Install metal drip edges** beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
7. **Install metal flashing termination** beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
8. **Cut flexible flashing** off flush with face of wall after masonry wall construction is completed.

C. **Install single-wythe CMU flashing system** in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

D. **Install reglets and nailers** for flashing and other related construction where they are shown to be built into masonry.

E. **Install weep holes** in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
2. Space weep holes 24 inches (600 mm) o.c., unless otherwise indicated.
3. Space weep holes formed from wicking material 16 inches (400 mm) o.c.
4. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
5. Trim wicking material flush with outside face of wall after mortar has set.

F. **Place cavity drainage material** in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.

G. **Install vents** in head joints in exterior wythes at spacing indicated. Use specified weep/vent products or open head joints to form vents.

1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.12 FIELD QUALITY CONTROL

A. **Inspectors:** The AOC may engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.

3.13 REPAIRING, POINTING, AND CLEANING

A. **Remove and replace masonry units** that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. **Pointing:** During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. **In-Progress Cleaning:** Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. **Final Cleaning:** After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
8. Clean stone trim to comply with stone supplier's written instructions.

3.14 MASONRY WASTE DISPOSAL

A. **Salvageable Materials:** Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. **Waste Disposal as Fill Material:** Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste.
3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.

C. **Excess Masonry Waste:** Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Government property.

END OF DIVISION FOUR

DIVISION FIVE - METALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes unit masonry assemblies consisting of the following:

1. Interior load-bearing wall framing.
2. Exterior non-load-bearing wall framing.
3. Steel framing and supports for ceiling-hung toilet compartments.
4. Steel framing and supports for operable partitions.
5. Steel framing and supports for overhead doors.
6. Steel framing and supports for counter-tops.
7. Steel framing and supports for mechanical and electrical equipment.
8. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.3 PERFORMANCE REQUIREMENTS

A. **Structural Performance:** Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.

1. **Design Loads:** As indicated.
2. **Deflection Limits:** Design framing systems to withstand design loads without deflections greater than the following:

   (a) Interior Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft. (239 Pa).
   (b) Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/240 of the wall height.

3. **Design framing systems** to provide for movement of framing members without damage or over-stressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).

B. **Cold-Formed Steel Framing, General:** Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."

1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."
2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

1.4 SUBMITTALS

A. **Product Data:** For each type of cold-formed metal framing product and accessory indicated.

B. **Shop Drawings:** Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. **Welding certificates.**

D. **Research/Evaluation Reports:** For cold-formed metal framing.

1.5 QUALITY ASSURANCE

A. **Engineering Responsibility:** Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. **Testing Agency Qualifications:** An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated.

C. **Product Tests:** Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, ductility, and metallic-coating thickness.

D. **Welding:** Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.6, "Structural Welding Code--Stainless Steel."

E. **Fire-Test-Response Characteristics:** Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

F. **AISI Specifications and Standards:** Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

G. **Preinstallation Conference:** Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. **Protect** cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. **Store** cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

1.7 COORDINATION

A. **Coordinate installation** of anchorages for metal fabrications. 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.

B. **Coordinate installation** of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 COLD-FORMED METAL FRAMING

A. **Materials:**

1. **Steel Sheet:** ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

   a. *Grade:* As required by structural performance.
   b. *Coating:* G60 (Z180) or G90 (Z275) for brick veneer backup.

2. **Steel Sheet for Vertical Deflection Clips:** ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

   a. *Grade:* As required by structural performance.
   b. *Coating:* G90 (Z275).

B. **Load-bearing Wall Framing:**

1. **Steel Studs:** Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

   a. *Minimum Base-Metal Thickness:* 0.0428 inch (1.09 mm) or as indicated.
   b. *Flange Width:* 1-3/8 inches (35 mm).
   c. *Section Properties:* 0.315 in.^{3}, or as indicated.

2. **Steel Track:** Manufacturer's standard U-shaped steel track, of web depths indicated, un-punched, with straight flanges, and as follows:

   a. *Minimum Base-Metal Thickness:* Matching steel studs.
   b. *Flange Width:* 1-1/4 inches (32 mm) minimum.

3. **Steel Box or Back-to-Back Headers:** Manufacturer's standard C-shapes used to form header beams, of web depths indicated, punched, with stiffened flanges, and as follows:

   a. *Minimum Base-Metal Thickness:* 0.0428 inch (1.09 mm).
   b. *Flange Width:* 1-3/8 inches (35 mm).
   c. *Section Properties:* As indicated.

D. **Steel Double-L Headers:** Manufacturer's standard L-shapes used to form header beams, of web depths indicated, and as follows:

   a. *Minimum Base-Metal Thickness:* 0.0428 inch (1.09 mm).
   b. *Top Flange Width:* 1-5/8 inches (41 mm).
   c. *Section Properties:* As indicated.

C. **Anchors, Clips, and Fasteners:**

1. **Steel Shapes and Clips:** ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
2. **Anchor Bolts:** ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
3. **Expansion Anchors:** Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
4. **Power-Actuated Anchors:** Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
5. **Mechanical Fasteners:** ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

a. *Head Type:* Low-profile head beneath sheathing, manufacturer's standard elsewhere.

6. **Welding Electrodes:** Comply with AWS standards.

D. **Miscellaneous Materials:**

1. **Galvanizing Repair Paint:** SSPC-Paint 20 or DOD-P-21035.
2. **Cement Grout:** Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
3. **Nonmetallic, Nonshrink Grout:** Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
4. **Shims:** Load bearing, high-density multimonomer plastic, nonleaching.

ii. **Sealer Gaskets:** Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.2 METAL FABRICATIONS

A. **Metals, General:** Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. **Ferrous Metals:**

1. **Steel Plates, Shapes, and Bars:** ASTM A 36/A 36M.
2. **Stainless-Steel Sheet, Strip, Plate, and Flat Bars:** ASTM A 666, Type 304.
3. **Stainless-Steel Bars and Shapes:** ASTM A 276, Type 304.
4. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
5. **Abrasive-Surface Floor Plate:** Steel plate with abrasive granules rolled into surface.
6. **Steel Tubing:** ASTM A 500, cold-formed steel tubing.
7. **Steel Pipe:** ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
8. **Slotted Channel Framing:** Cold-formed metal channels with continuous slot complying with MFMA-3.

a. *Size of Channels:* 1-5/8 by 1-5/8 inches (41 by 41 mm) or as indicated.
b. *Material:* Galvanized steel complying with ASTM A 653/A 653M, with G90 (Z275) coating; 0.079-inch (2-mm) nominal thickness unless otherwise noted.
c. *Material:* Steel complying with ASTM A 1008/A 1008M, 0.0966-inch (2.5-mm) minimum thickness; hot-dip galvanized after fabrication.

9. **Cast Iron:** ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.

C. **Nonferrous Metals:**

1. **Aluminum Plate and Sheet:** ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
2. **Aluminum Extrusions:** ASTM B 221 (ASTM B 221M), Alloy 6063-T6.
3. **Aluminum-Alloy Rolled Tread Plate:** ASTM B 632/B 632M, Alloy 6061-T6.
4. **Aluminum Castings:** ASTM B 26/B 26M, Alloy 443.0-F.
5. **Bronze Plate, Sheet, Strip, and Bars:** ASTM B 36/B 36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).
6. **Bronze Extrusions:** ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).
7. **Bronze Castings:** ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).
8. **Nickel Silver Extrusions:** ASTM B 151/B 151M, Alloy UNS No. C74500.
9. **Nickel Silver Castings:** ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

D. **Fasteners:** Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

1. **Steel Bolts and Nuts:** Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
2. **Stainless-Steel Bolts and Nuts:** Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593 (ASTM F 738M) for bolts and ASTM F 594 (ASTM F 836M) for nuts, Alloy Group 1 (A1).
3. **Anchor Bolts:** ASTM F 1554, Grade 36.

    a. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

4. **Eyebolts:** ASTM A 489.
5. **Machine Screws:** ASME B18.6.3 (ASME B18.6.7M).
6. **Lag Bolts:** ASME B18.2.1 (ASME B18.2.3.8M).
7. **Wood Screws:** Flat head, ASME B18.6.1.
8. **Plain Washers:** Round, ASME B18.22.1 (ASME B18.22M).
9. **Lock Washers:** Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).
10. **Cast-in-Place Anchors in Concrete:** Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

a. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

11. **Expansion Anchors:** Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

    a. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
    b. Material for Anchors in Exterior Locations: Alloy Group 1 (A1) stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).

E. **Miscellaneous Materials:**

1. **Welding Rods and Bare Electrodes:** Select according to AWS specifications for metal alloy welded.
2. **Shop Primers:** Provide primers that comply with Division 09 painting Articles.
3. **Universal Shop Primer:** Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

    a. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
    b. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

4. **Zinc-Rich Primer:** Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

    a. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

5. **Galvanizing Repair Paint:** High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
6. **Bituminous Paint:** Cold-applied asphalt emulsion complying with ASTM D 1187.
7. **Non-shrink, Nonmetallic Grout:** Factory-packaged, non-staining, non-corrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
8. **Concrete Materials and Properties:** Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

F. **Fabrication, General:**

1. **Shop Assembly:** Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
2. **Cut, drill, and punch** metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
3. **Form bent-metal corners** to smallest radius possible without causing grain separation or otherwise impairing work.
4. **Form exposed work** true to line and level with accurate angles and surfaces and straight edges.
5. **Weld corners** and seams continuously to comply with the following:

    a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    b. Obtain fusion without undercut or overlap.
    c. Remove welding flux immediately.
    d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

6. **Form exposed connections** with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
7. **Fabricate seams** and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
8. **Cut, reinforce, drill, and tap** metal fabrications as indicated to receive finish hardware, screws, and similar items.
9. **Provide for anchorage** of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

    a. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

G. **Miscellaneous Framing and Supports:** Provide steel framing and supports not specified in other Sections as needed to complete the Work.

1. **Fabricate units** from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap

units to receive hardware, hangers, and similar items.

a. Fabricate units from slotted channel framing where indicated.
b. Furnish inserts if units are installed after concrete is placed.

2. **Fabricate supports** for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
3. **Galvanize miscellaneous** framing and supports where indicated.
4. **Prime miscellaneous** framing and supports with zinc-rich primer where indicated.

H. **Loose Steel Lintels:** Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.

1. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches (200 mm), unless otherwise indicated.
2. Galvanize loose steel lintels located in exterior walls.
3. Prime loose steel lintels located in exterior walls with zinc-rich primer.

I. **Shelf Angles:** Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated. Provide mitered and welded units at corners. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.

1. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
2. Galvanize shelf angles located in exterior walls.
3. Prime shelf angles located in exterior walls with zinc-rich primer.
4. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

J. **Loose Bearing and Leveling Plates:** Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

1. Galvanize plates after fabrication.
2. Prime plates with zinc-rich primer.

K. **Steel Weld Plates and Angles:** Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

L. **Structural-steel Door Frames:** Fabricate structural-steel door frames from steel shapes, plates, and bars of size and to dimensions indicated, fully welded together, with 5/8-by-1-1/2-inch (16-by-38-mm) steel channel stops, unless otherwise indicated. Plug-weld built-up members and continuously weld exposed joints. Secure removable stops to frame with countersunk machine screws, uniformly spaced at not more than 10 inches (250 mm) o.c. Reinforce frames and drill and tap as necessary to accept finish hardware. Provide with integrally welded steel strap anchors for securing door frames into adjoining concrete or masonry.

1. Extend bottom of frames to floor elevation indicated with steel angle clips welded to frames for anchoring frame to floor with expansion shields and bolts.
2. Galvanize exterior steel frames and interior steel frames, where indicated.
3. Prime exterior steel frames and interior steel frames, where indicated with zinc-rich primer.

M. **Metal Ladders:**

1. **General:**

a. Comply with ANSI A14.3, unless otherwise indicated.
b. For elevator pit ladders, comply with ASME A17.1.
c. Space siderails 18 inches (457 mm) apart, unless otherwise indicated.
d. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted brackets, made from same metal as ladder.

2. **Aluminum Ladders:**

a. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches (64 mm) deep, 3/4 inch (19 mm) wide, and 1/8 inch (3.2 mm) thick.
b. Rungs: Extruded-aluminum tubes, not less than 3/4 inch (19 mm) deep and not less than 1/8 inch (3.2 mm) thick, with ribbed tread surfaces.
c. Fit rungs in centerline of siderails; fasten by welding or with stainless-steel fasteners or brackets and aluminum rivets.

N. **Ladder Safety Cages:**

1. **General:**

a. Fabricate ladder safety cages to comply with ANSI A14.3. Assemble by welding or with stainless-steel fasteners.
b. Provide primary hoops at tops and bottoms of cages and spaced not more than 20 feet (6 m) o.c. Provide secondary intermediate hoops spaced not more than 48 inches (1200 mm) o.c. between primary hoops.
c. Fasten assembled safety cage to ladder rails and adjacent construction by welding or with stainless-steel fasteners, unless otherwise indicated.

2. **Aluminum Ladder Safety Cages:**

   a. *Primary Hoops:* 1/4-by-4-inch (6.4-by-100-mm) flat bar hoops.
   b. *Secondary Intermediate Hoops:* 1/4-by-2-inch (6.4-by-50-mm) flat bar hoops.
   c. *Vertical Bars:* 1/4-by-2-inch (6.4-by-50-mm) flat bars secured to each hoop.

O. **Metal Bollards:**

1. **Fabricate** metal bollards from Schedule 40 steel pipe.

   a. Cap bollards with 1/4-inch- (6.4-mm-) thick steel plate.
   b. Where bollards are indicated to receive push-button controls for door operators, provide necessary cutouts for push-button controls and hole for wire.

2. **Fabricate bollards** with 3/8-inch- (9.5-mm-) thick steel base-plates for bolting to concrete slab. Drill base-plates at all 4 corners for 3/4-inch (19-mm) anchor bolts.

   a. Where bollards are to be anchored to sloping concrete slabs, angle base-plates for plumb alignment of bollards.

3. **Fabricate sleeves** for bollard anchorage from steel pipe with 1/4-inch- (6.4-mm-) thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches (200 mm) deep and 3/4 inch (19 mm) larger than OD of bollard.
4. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch (6.4-mm) wall-thickness steel tubing with an OD approximately 1/16 inch (1.5 mm) less than ID of bollards. Match drill sleeve and bollard for 3/4 inch (19 mm) steel machine bolt.

P. **Pipe Guards:** Fabricate pipe guards from 3/8-inch- (9.5-mm-) thick by 12-inch- (300-mm-) wide steel plate, bent to fit flat against the wall or column at both ends and to fit around pipe with 2-inch (50-mm) clearance between pipe and pipe guard. Drill each end for two 3/4-inch (19-mm) anchor bolts. Galvanize pipe guards after fabrication.

Q. **Abrasive Metal Nosings, Treads, and Thresholds:**

1. **Cast-Metal Units (Exterior Doors & Stairs):** Cast gray iron, Class 20, with an integral abrasive finish consisting of aluminum oxide, silicon carbide, or a combination of both. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions.

   a. **Nosings:** Cross-hatched units, 4 inches (100 mm) wide with 1-inch (25-mm) lip, for casting into concrete steps.
   b. **Treads:** Cross-hatched units, full depth of tread with 3/4-by-3/4-inch (19-by-19-mm) nosing, for application over bent plate treads or existing stairs.
   c. **Thresholds:** Fluted-saddle-type units, 5 inches (125 mm) wide by 1/2 inch (12 mm) high, with tapered edges.

2. **Extruded Units:** Aluminum, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions.

   a. Provide ribbed units, with abrasive filler strips projecting 1/16 inch (1.5 mm) above aluminum extrusion.
   b. Provide solid-abrasive-type units without ribs.
   c. Nosings: Square-back units, 3 inches (75 mm) wide, for casting into concrete steps.
   d. Treads: Beveled-back units, full depth of tread with 1-3/8-inch (35-mm) lip, for application over existing stairs.

3. **Provide anchors** for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
4. **Drill** for mechanical anchors and countersink. Locate not more than 4 inches (100 mm) from ends and not more than 12 inches (300 mm) o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.

   a. Provide 2 rows of holes for units more than 5 inches (125 mm) wide, with 2 holes aligned at ends and intermediate holes staggered.

5. **Apply bituminous paint** to concealed bottoms, sides, and edges of cast-metal units set into concrete.
6. **Apply clear lacquer** to concealed bottoms, sides, and edges of extruded units set into concrete.

R. **Finishes, General:** Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal fabrications after assembly.

S. **Steel and Iron Finishes:**

1. **Galvanizing:** Hot-dip galvanize items as indicated to comply with applicable standard listed below:

   a. ASTM A 123/A 123M, for galvanizing steel and iron products.
   b. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

2. **Preparation for Shop Priming:** Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

   a. *Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer*: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   b. *Interiors (SSPC Zone 1A):* SSPC-SP 3, "Power Tool Cleaning."

3. **Shop Priming:** Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Stripe paint corners, crevices, bolts, welds, and sharp edges.

T. **Stainless-steel Finishes:** Remove tool and die marks and stretch lines or blend into finish. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

1. **Bright, Directional Satin Finish:** No. 4 or Dull Satin Finish, No. 6, as indicated. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

U. **Aluminum Finishes:** Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

1. **As-Fabricated Finish:** AA-M10 (Mechanical Finish: as fabricated, unspecified).
2. **Class I, Clear Anodic Finish:** AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

V. **Copper-alloy Finishes:**

1. **Finish designations** for copper alloys comply with the system established for designating copper-alloy finish systems defined in NAAMM's "Metal Finishes Manual for Architectural and Metal Products."
2. **Cast-Bronze Nickel Silver Finish:** M12 (Mechanical Finish: matte finish, as fabricated).
3. **Extruded-Bronze Nickel Silver Finish:** M11 (Mechanical Finish: specular, as fabricated).
4. **Bronze Plate, Sheet, Strip, and Bar Finish:** M10 (Mechanical Finish: unspecified, as fabricated).

PART 3 - EXECUTION

3.1 COLD-FORMED METAL FRAMING:

A. **Examination:** Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. **Preparation:**

1. **Before sprayed fire-resistive materials** are applied, attach continuous angles,

supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

2. **After applying** sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.
3. **Install load bearing shims** or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
4. **Install sealer gaskets** to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

C. **Installation, General:**

1. **Cold-formed** metal framing may be shop or field fabricated for installation, or it may be field assembled.
2. **Install cold-formed** metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
3. **Install shop- or field-fabricated**, cold-formed framing and securely anchor to supporting structure. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).
4. **Install cold-formed** metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

    a. Cut framing members by sawing or shearing; do not torch cut.
    b. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

        1) Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
        2) Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

5. **Install framing members** in one-piece lengths unless splice connections are indicated for track or tension members.
6. **Install temporary** bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
7. **Do not bridge** building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
8. **Install insulation**, specified in Division 07 Section "Thermal Insulation," in built-up

exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

9. **Fasten hole reinforcing plate** over web penetrations that exceed size of manufacturer's standard punched openings.
10. **Erection Tolerances:** Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

    a. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

D. **Load-bearing Wall Installation:**

1. **Install** continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:

    a. *Anchor Spacing*: To match stud spacing or as shown on Shop Drawings.

2. **Squarely seat studs** against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows: 16 inches (406 mm) or as indicated.
3. **Set studs plumb**, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar configurations.
4. **Align studs vertically** where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
5. **Align floor and roof framing** over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.
6. **Anchor studs** abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
7. **Install headers** over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

    a. *Frame wall openings* with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
    b. *Install runner tracks* and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

8. **Install supplementary framing**, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing. If type of supplementary support is not indicated,

comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

9. **Install horizontal bridging** in stud system, spaced 48 inches (1220 mm) or as indicated on Shop Drawings. Fasten at each stud intersection.

    a. *Bridging:* Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of 2 screws into each flange of the clip angle for framing members up to 6 inches (150 mm) deep.

10. **Install steel sheet diagonal bracing straps** to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
11. **Install miscellaneous framing and connections**, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

D. **Exterior Non-load-bearing Wall Installation:**

1. **Install continuous tracks** sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
2. **Fasten both flanges** of studs to top and bottom track, unless otherwise indicated. Space studs as follows: 16 inches (406 mm) or as indicated.
3. **Set studs plumb**, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
4. **Isolate non-load-bearing** steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

    a. *Install single-leg deflection tracks* and anchor to building structure.
    b. *Connect vertical deflection clips* to bypassing studs and anchor to building structure.

5. **Install horizontal bridging** in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
6. **Install miscellaneous** framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

E. **Joist Installation:** See Task Order-specific sections as required.

F. **Field Quality Control:**

1. **Testing:** AOC may engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
2. **Field and shop welds** will be subject to testing and inspecting.
3. **Testing agency** will report test results promptly and in writing to Contractor and AOC.
4. **Remove and replace work** where test results indicate that it does not comply with

specified requirements.

5. **Additional testing and inspecting**, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

G. **Repairs and Protection:**

1. **Galvanizing Repairs:** Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
2. **Provide final protection and maintain conditions**, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

3.2 METAL FABRICATIONS

A. **Installation, General:**

1. **Cutting, Fitting, and Placement:** Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
2. **Field Welding:** Comply with the following requirements:

   a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   b. Obtain fusion without undercut or overlap.
   c. Remove welding flux immediately.
   d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3. **Fastening to In-Place Construction:** Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

   a. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

4. **Corrosion Protection:** Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

B. **Installing Miscellaneous Framing and Supports:** Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

1. **Anchor supports** for operable partitions securely to and rigidly brace from building structure.
2. **Support steel girders** on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

    a. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

3. **Install pipe columns** on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

C. **Installing Bearing and Leveling Plates:**

1. **Clean concrete and masonry bearing surfaces** of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
2. **Set bearing and leveling plates** on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

    a. Use non-shrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use non-shrink, nonmetallic grout in exposed locations, unless otherwise indicated.
    b. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

D. **Installing Metal Bollards:**

1. **Anchor bollards** to existing construction with expansion anchors. Provide four 3/4-inch (19-mm) bolts at each bollard, unless otherwise indicated.
2. **Anchor bollards** in new concrete with pipe sleeves preset and anchored into concrete. Fill annular space around bollard solidly with non-shrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch (3 mm) toward bollard.
3. **Anchor internal sleeves** for removable bollards in concrete by inserting into pipe sleeves preset into concrete. Fill annular space around internal sleeves solidly with non-shrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written

instructions. Slope grout up approximately 1/8 inch (3 mm) toward internal sleeve.

4. **Place removable bollards** over internal sleeves and secure with 3/4-inch (19-mm) machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. AOC will furnish padlocks.
5. **Fill bollards solidly** with concrete, mounding top surface to shed water. (Do not fill removable bollards with concrete).

E. **Installing Pipe Guards:** Provide pipe guards at exposed vertical pipes in parking garage where not protected by curbs or other barriers. Install by bolting to wall or column with expansion anchors. Provide four 3/4-inch (19-mm) bolts at each pipe guard. Mount pipe guards with top edge 26 inches (660 mm) above driving surface.

F. **Installing Nosings, Treads, and Thresholds:** Center nosings on tread widths. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 07 Section "Joint Sealants" to provide a watertight installation.

G. **Adjusting and Cleaning:**

1. **Touch-up Painting:** Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint un-coated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
2. **Galvanized Surfaces:** Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF DIVISION FIVE

DIVISION SIX - WOOD, PLASTICS AND COMPOSITES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes the following:

1. Rough Carpentry (incidental to light-gage metal framing or drywall partition framing) and other minor rough carpentry work in support of other trades.
2. Miscellaneous Carpentry
3. Finish Carpentry
4. Architectural Woodwork

1.3 DEFINITIONS

A. **Exposed Framing:** Framing not concealed by other construction.

B. **Dimension Lumber:** Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.

C. **Lumber grading agencies**, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. SPIB: The Southern Pine Inspection Bureau.
4. WCLIB: West Coast Lumber Inspection Bureau.
5. WWPA: Western Wood Products Association.

D. **Interior architectural woodwork** includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

A. **Product Data:** For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments specified to be High-Temperature (HT) type, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
6. For each type of woodwork product indicated, including cabinet hardware and accessories; finishing materials and processes; high-pressure decorative laminate, and finishing materials and processes.

B. **Material Certificates:** For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

C. **Samples for Initial Selection:**

1. Shop-applied transparent finishes.
2. Shop-applied opaque finishes.
3. Plastic laminates.
4. PVC edge material.
5. Thermoset decorative panels.
6. Solid-surfacing materials.

D. **Samples for Verification:**

1. **Lumber with or for transparent finish**, not less than 50 sq. in. (300 sq. cm), for each species and cut, finished on 1 side and 1 edge.
2. **Veneer leaves** representative of and selected from flitches to be used for transparent-finished woodwork.
3. **Veneer-faced panel products** with or for transparent finish, 8 by 10 inches (200 by 250 mm), for each species and cut. Include at least one face-veneer seam and finish as specified.
4. **Lumber and panel products** with shop-applied opaque finish, 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels, for each finish system and color, with 1/2 of exposed surface finished.
5. **Plastic laminates**, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish with 1 sample applied to core material and specified edge material applied

to 1 edge.

6. **Solid-surfacing materials**, 6 inches (150 mm) square.
7. **Corner pieces as follows**:

   a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches (450 mm) high by 18 inches (450 mm) wide by 6 inches (150 mm) deep.
   b. Miter joints for standing trim.

8. **Exposed cabinet hardware** and accessories, one unit for each type and finish.

E. **Shop Drawings:** Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for items installed in architectural woodwork.
4. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
5. Apply WI-certified compliance label to first page of Shop Drawings.

1.5 QUALITY ASSURANCE

A. **Source Limitations for Engineered Wood Products:** Obtain each type of engineered wood product through one source from a single manufacturer.

B. **Forest Certification:** For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":

1. Dimension lumber framing.
2. Miscellaneous lumber.

C. **Woodwork: Quality Standard:** Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements. Provide AWI Quality Certification Program certificates indicating that woodwork, including installation, complies with requirements of grades specified.

D. **Woodwork Fabricator Qualifications:** Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.

1.6 DELIVERY, STORAGE, AND HANDLING

A. **Stack lumber flat** with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 **WOOD PRODUCTS, GENERAL**

A. **Materials, General:**

1. **Lumber:** DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

   a. Factory mark each piece of lumber with grade stamp of grading agency.
   b. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
   c. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   d. Provide dressed lumber, S4S, unless otherwise indicated.

B. **Engineered Wood Products:** Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. **Allowable Design Stresses:** Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
2. **Softwood Plywood:** DOC PS 1.
3. **Hardwood Plywood:** HPVA HP-1, made with adhesive containing no urea-formaldehyde resin.
4. **Hardboard:** AHA A135.4
5. **Medium-Density Fiberboard:** ANSI A208.2, Grade MD-Exterior Glue.
6. **Particleboard:** ANSI A208.1, Grade M-2-Exterior Glue.

C. **Wood-preservative-treated Lumber:**

1. **Preservative Treatment by Pressure Process:** AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

   a. Preservative Chemicals: Acceptable to authorities having jurisdiction[and

containing no arsenic or chromium].

b. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

2. **Kiln-dry lumber** after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
3. **Mark lumber** with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
4. **Application:** Treat items indicated on Drawings, and the following:

   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, stripping**,** and similar concealed members in contact with masonry or concrete.
   3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
   4. Wood floor plates that are installed over concrete slabs-on-grade.

D. **Fire-retardant-treated Materials:**

1. **General:** Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).

   a. Use Exterior type for exterior locations and where indicated.
   b. Use Interior Type A, unless otherwise indicated.

2. **Identify fire-retardant-treated wood** with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
3. **For exposed items** indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
4. **Application:** Treat items indicated on Drawings, and concealed blocking and plywood backing panels.

E. **Dimension Lumber Framing:**

1. **Maximum Moisture Content:** 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness.

F. **Engineered Wood Products:**

1. **Laminated-Veneer Lumber:** Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to

ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.

a. *Extreme Fiber Stress in Bending, Edgewise:* 2900 psi (20 MPa) or as indicated for 12-inch nominal- (286-mm actual-) depth members.
b. *Modulus of Elasticity, Edgewise:* 1,800,000 psi (12 400 MPa) or as indicated.

2. **Parallel-Strand Lumber:** Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.

a. *Extreme Fiber Stress in Bending, Edgewise:* 2900 psi (20 MPa) for 12-inch nominal- (286-mm actual-) depth members.
b. *Modulus of Elasticity, Edgewise:* 1,800,000 psi (12 400 MPa) or as indicated.

G. **Miscellaneous Lumber:**

1. **General:** Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

a. Blocking.
b. Nailers.
c. Rooftop equipment bases and support curbs.
d. Cants.
e. Furring.
f. Grounds.
g. Utility shelving.

2. **For items of dimension lumber size**, provide Standard, Stud, or No. 3 grade lumber with 19 percent maximum moisture content.
3. **For exposed boards**, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

a. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WWPA.
b. Mixed southern pine, No. 1 grade; SPIB.
c. Hem-fir or hem-fir (north), Select Merchantable or No. 1 Common grade; NLGA, WCLIB, or WWPA.
d. Spruce-pine-fir (south) or spruce-pine-fir, Select Merchantable or No. 1 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

4. **For concealed boards**, provide lumber with 19 percent maximum moisture content, Construction or No. 2 Common.
5. **For blocking** not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate

defects that will interfere with its attachment and purpose.

6. **For blocking and nailers used for attachment** of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
7. **For furring strips** for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

H. **Plywood Backing Panels:** For Telephone and Electrical Equipment Backing Panels provide DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

I. **Fasteners:** Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

1. **Nails, Brads, and Staples:** ASTM F 1667.
2. **Power-Driven Fasteners:** NES NER-272.
3. **Wood Screws:** ASME B18.6.1.
4. **Lag Bolts:** ASME B18.2.1 (ASME B18.2.3.8M).
5. **Bolts:** Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
6. **Expansion Anchors:** Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

   a. *Material:* Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

J. **Metal Framing Anchors:**

1. **Allowable Design Loads:** Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
2. **Galvanized Steel Sheet:** Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation. Use for interior locations where stainless steel is not indicated.
3. **Stainless-Steel Sheet:** ASTM A 666, Type 304 or 316. Use for exterior locations and where indicated.
4. **Hold-Downs:** Brackets for bolting to wall studs and securing to foundation walls with

anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.

a. *Bolt Diameter:* 5/8 inch (15.8 mm) or as indicated.
b. *Width:* 2-1/2 inches (64 mm) or as indicated.
c. *Body Thickness:* 0.108 inch (2.8 mm).
d. *Base Reinforcement Thickness:* 0.108 inch (2.8 mm).

K. **Miscellaneous Materials:**

1. **Sill-Sealer Gaskets:** Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.

L. **Adhesives for Gluing Furring and to Concrete or Masonry:** Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

M. **Water-Repellent Preservative:** NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

2.2 INTERIOR WOOD TRIM

A. **General:** Provide kiln-dried finished (surfaced) material without finger-jointing, unless otherwise indicated.

B. **Softwood Lumber Trim for Transparent (Stain or Clear) Finish:** Provide one of the following species and grade:

1. Grade D Select eastern white pine; NeLMA or NLGA or.
2. Grade D Select (Quality) Idaho white, lodgepole, ponderosa, or sugar pine; NLGA or WWPA.

C. **Hardwood Lumber Trim for Transparent (Stain or Clear) Finish:** Clear selected for compatible grain and color. In AOC “Principal Buildings” provide species, grade, and cut to match existing or adjoining lumber.

D. **Lumber Trim for Opaque (Painted) Finish:** Either finger-jointed or solid lumber, of one of the following species and grades:

1. **Grade D Select** eastern white pine; NeLMA or NLGA.
2. **Grade D Select (Quality)** Idaho white, lodgepole, ponderosa, or sugar pine; NLGA or WWPA.

E. **Moldings:** Made to patterns included in WMMPA WM 7 and graded according to WMMPA WM 4.

1. **Moldings for Transparent (Stain or Clear) Finish:** N-grade eastern white, Idaho white, lodgepole, ponderosa, or sugar pine, selected for compatible grain and color, or hardwood selected to match existing/adjoining material scheduled to remain.
2. **Moldings for Opaque (Painted) Finish:** P-grade eastern white, Idaho white, lodgepole, ponderosa, or sugar pine.

2.3 SHELVING AND CLOTHES RODS

A. **Shelving:** Made from one of the following materials, 3/4-inch (19-mm) thick. Do not use particleboard that contains urea formaldehyde.

1. **Melamine-faced** particleboard with radiused and filled front edge, or
2. **Wood boards** of same species and grade indicated above for interior lumber trim for transparent finish.

B. **Shelf Cleats:** 3/4-by-3-1/2-inch (19-by-89-mm) boards, of same species and grade indicated above for interior lumber trim for opaque finish.

C. **Shelf Brackets:** Prime-painted formed steel with provision to support clothes rod where rod is indicated.

D. **Clothes Rods:** 1-1/4-inch- (32-mm-) diameter, chrome-plated steel or stainless-steel tubes.

E. **Rod Flanges:** Chrome-plated steel or Stainless steel.

2.4 EXTERIOR STANDING AND RUNNING TRIM

A. **Lumber Trim for Painted Applications:** Kiln-dried, solid lumber with surfaced (smooth) face and of the following species and grade:

1. **Grade D Select (Quality)** eastern white pine, eastern hemlock-balsam fir-tamarack, eastern spruce, or white woods; NELMA, NLGA, WCLIB, or WWPA.
2. **Grade D Select** northern white cedar; NELMA or NLGA.

B. **Moldings:** Made to patterns included in WMMPA WM 7. Wood moldings made from kiln-dried stock and graded under WMMPA WM 4.

1. **Moldings for Opaque Finish (Painted):** P-grade eastern white, Idaho white, lodgepole, ponderosa, or sugar pine.

C. **MDO Trim:** Exterior Grade B-B, MDO plywood.

2.5 ARCHITECTURAL WOODWORK

A. **Materials:**

1. **Lumber:** As specified above.
2. **High-Pressure Decorative Laminate:** NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
3. **Solid-Surfacing Material:** Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.

    a. *Type:* Standard type, unless Special Purpose type is indicated.
    b. *Colors and Patterns:* As selected by AOC from manufacturer's full range.

4. **Tempered Float Glass for Cabinet Doors:** ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.
5. **Tempered Float Glass for Cabinet Shelves:** ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3; with exposed edges seamed before tempering, 6 mm thick.

B. **Cabinet Hardware and Accessories:**

1. **General:** Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Article, Hardware."
2. **Butt Hinges:** 2-3/4-inch (70-mm), 5-knuckle steel hinges made from 0.095-inch- (2.4-mm-) thick metal, and as follows:

    a. *Semiconcealed Hinges for Flush Doors:* BHMA A156.9, B01361.
    b. *Semiconcealed Hinges for Overlay Doors:* BHMA A156.9, B01521.

3. **Frameless Concealed Hinges (European Type):** BHMA A156.9, B01602, 135 degrees of opening.
4. **Back-Mounted Pulls:** BHMA A156.9, B02011.
5. **Wire Pulls:** Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.
6. **Catches:** Magnetic catches, BHMA A156.9, B03141 or Roller catches, as indicated.
7. **Adjustable Shelf Standards and Supports:** BHMA A156.9, B04071; with shelf rests, B04081.
8. **Shelf Rests:** BHMA A156.9, B04013; metal.
9. **Drawer Slides:** BHMA A156.9, B05091.

    a. *Standard Duty (Grade 1, Grade 2, and Grade 3):* Side mounted full-extension type; zinc-plated steel with polymer rollers.
    b. *Heavy Duty (Grade 1HD-100 and Grade 1HD-200):* Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
    c. *Box Drawer Slides:* Grade 1; for drawers not more than 6 inches (150 mm) high and 24 inches (600 mm) wide.
    d. *File Drawer Slides:* Grade 1HD-200; for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
    e. *Pencil Drawer Slides:* Grade 2; for drawers not more than 3 inches (75 mm) high

and 24 inches (600 mm) wide.
Keyboard Slides: Grade 1; for computer keyboard shelves.

g. *Trash Bin Slides:* Grade 1HD-100; for trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide.

10. **Aluminum Slides for Sliding Glass Doors:** BHMA A156.9, B07063.
11. **Door Locks:** BHMA A156.11, E07121.
12. **Drawer Locks:** BHMA A156.11, E07041.
13. **Grommets for Cable Passage through Countertops:** 1-1/4-inch (32-mm) OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.
14. **Exposed Hardware Finishes:** For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

    a. *Dark, Oxidized, Satin Bronze, Oil Rubbed:* BHMA 613 for bronze base; BHMA 640 for steel base; match Architect's sample.
    b. *Bright Brass, Clear Coated:* BHMA 605 for brass base; BHMA 632 for steel base.
    c. *Satin Brass, Blackened, Bright Relieved, Clear Coated:* BHMA 610 for brass base; BHMA 636 for steel base.
    d. *Satin Chromium Plated:* BHMA 626 for brass or bronze base; BHMA 652 for steel base.
    e. *Satin Stainless Steel:* BHMA 630.

15. **For concealed hardware**, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

C. **Fabrication, General:**

1. **Interior Woodwork Grade:** Unless otherwise indicated, provide Premium-grade interior woodwork for Member and Public areas in Principal Buildings and Custom-grade for remaining areas complying with referenced quality standard.
2. **Wood Moisture Content:** Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
3. **Sand fire-retardant-treated wood** lightly to remove raised grain on exposed surfaces before fabrication.
4. **Fabricate woodwork** to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

    a. *Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch (19 mm) Thick or Less:* 1/16 inch (1.5 mm).
    b. *Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick:* 1/8 inch (3 mm).
    c. *Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails:* 1/16 inch (1.5 mm).

5. **Complete fabrication**, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

    a. *Notify AOC* seven days in advance of the dates and times woodwork fabrication will be complete.
    b. *Trial fit assemblies* at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

6. **Shop-cut openings** to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of varnish.
7. **Install glass** to comply with applicable requirements in Division 8 Article "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

D. **Interior Ornamental Work for Transparent Finish:**

1. **Interior ornamental work** for transparent finish includes the following:

    a. Balustrades.
    b. Columns.
    c. Grilles.
    d. Mantels.
    e. Pediment heads.
    f. Pilasters.

2. **Grade:** Premium.
3. **Wood Species and Cut:** Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building, unless otherwise indicated.

E. **Interior Ornamental Work for Opaque Finish:**

1. **Interior ornamental work** for opaque finish includes the following:

    a. Balustrades.
    b. Columns.
    c. Grilles.
    d. Mantels.

e. Pediment heads.
f. Pilasters.

2. **Grade:** Custom.
3. **Wood Species:** Any closed-grain hardwood.

F. **Wood Cabinets for Transparent Finish:**

1. **Grade:** Premium.
2. **AWI Type of Cabinet Construction:** Flush overlay or As indicated.
3. **Wood Species and Cut for Exposed Surfaces:** As indicated or to match existing or adjoining work to remain.

   a. *Grain Direction:* Vertically for drawer fronts, doors, and fixed panels or ss indicated.
   b. *Matching of Veneer Leaves:* Book or Slip match.
   c. *Vertical Matching of Veneer Leaves:* End match.
   d. *Veneer Matching within Panel Face:* Balance match.
   e. *Veneer Matching within Room:* Provide cabinet veneers in each room or other space from a single flitch with doors, drawer fronts, and other surfaces matched in a sequenced set with continuous match where veneers are interrupted perpendicular to the grain.

4. **Semiexposed Surfaces:** Provide surface materials indicated below:

   a. *Surfaces Other Than Drawer Bodies:* Compatible species to that indicated for exposed surfaces, stained to match.
   b. *Drawer Sides and Backs:* Solid-hardwood lumber.
   c. *Drawer Bottoms:* Hardwood plywood.
   d. *Provide dust panels* of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

G. **Wood Cabinets for Opaque Finish:**

1. **Grade:** Custom.
2. **AWI Type of Cabinet Construction:** Flush overlay or as indicated.
3. **Species for Exposed Lumber Surfaces:** Any closed-grain hardwood.
4. **Panel Product for Exposed Surfaces:** Medium-density overlay.
5. **Semiexposed Surfaces:** Provide surface materials indicated below:

   1. *Surfaces Other Than Drawer Bodies:* Match materials indicated for exposed surfaces.
   2. *Drawer Sides and Backs:* Solid-hardwood lumber.
   3. *Drawer Bottoms:* Hardwood plywood.
   4. *Provide dust panels* of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

H. **Plastic-laminate Cabinets:**

1. **Grade:** Custom.
2. **AWI Type of Cabinet Construction:** Flush overlay or as indicated.
3. **Laminate Cladding for Exposed Surfaces:** High-pressure decorative laminate complying with the following requirements:

   a. *Horizontal Surfaces Other Than Tops:* Grade HGS.
   b. *Postformed Surfaces:* Grade HGP.
   c. *Vertical Surfaces:* Grade HGS.
   d. *Edges:* Grade HGS.

4. **Materials for Semi-exposed Surfaces:**

   a. *Surfaces Other Than Drawer Bodies:* High-pressure decorative laminate, Grade CLS.

      1) *Edges of Plastic-Laminate Shelves:* PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
      2) *For semiexposed backs of panels* with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS or CLS.

   b. *Drawer Sides and Backs:* Solid-hardwood lumber.
   c. *Drawer Bottoms:* Hardwood plywood.

5. **Concealed Backs of Panels with Exposed Plastic Laminate Surfaces:** High-pressure decorative laminate, Grade BKL.
6. **Colors, Patterns, and Finishes:** Provide materials and products that result in colors and textures of exposed laminate surfaces as selected by AOC from laminate manufacturer's full range.
7. **Provide dust panels** of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

I. **Plastic-laminate Countertops:**

1. **Grade:** Custom.
2. **High-Pressure Decorative Laminate Grade:** HGS or HGP, as indicated by application.
3. **Colors, Patterns, and Finishes:** Provide materials and products that result in colors and textures of exposed laminate surfaces as selected by AOC from manufacturer's full range in the solid colors, matte finish.
4. **Grain Direction:** Parallel to cabinet fronts.
5. **Edge Treatment:** Same as laminate cladding on horizontal surfaces.
6. **Core Material:** Particleboard made with exterior glue, medium-density fiberboard made with exterior glue, exterior-grade plywood, or, as indicated, fire-retardant particleboard.

7. **Core Material at Sinks:** Particleboard made with exterior glue, medium-density fiberboard made with exterior glue or exterior-grade plywood.
8. **Backer Sheet:** Provide plastic-laminate backer sheet, Grade BKL, on underside of countertop substrate.

J. **Solid-surfacing-material Countertops:**

1. **Grade:** Premium.
2. **Solid-Surfacing-Material Thickness:** 3/4 inch (19 mm).
3. **Colors, Patterns, and Finishes:** Provide materials and products that result in colors of solid-surfacing material as selected by AOC from manufacturer's full range.
4. **Fabricate tops in one piece**, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing. Fabricate tops with shop-applied edges of materials and configuration indicated.
5. **Install integral sink bowls** in countertops in shop.
6. **Drill holes in countertops** for plumbing fittings and soap dispensers in shop.

K. **Shop Finishing:**

1. **Grade:** Provide finishes of same grades as items to be finished.
2. **General:** Shop finish transparent-finished interior architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation. Refer to Division 9 painting Sections for finishing opaque-finished architectural woodwork.
3. **Preparation for Finishing:** Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

    a. *Backpriming:* Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.

4. **Transparent Finish:**

    a. *Grade:* Premium.
    b. *AWI Finish System:* Catalyzed lacquer or conversion varnish, as indicated.
    c. *Staining:* Match Architect's sample.
    d. *Wash Coat for Stained Finish:* Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
    e. *Open Finish for Open-Grain Woods:* Do not apply filler to open-grain woods.
    f. *Filled Finish for Open-Grain Woods:* After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.

1) Apply wash-coat sealer after staining and before filling.

g. *Sheen:* Satin, 31-45 or Semigloss, 46-60 gloss units measured on 60-degree gloss meter per ASTM D 523, as indicated or to match existing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. **Examine substrates,** with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. **General:** Clean substrates of projections and substances detrimental to application. Before installing finish carpentry or architectural woodwork, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours, unless longer conditioning is recommended by manufacturer.

1. Prime lumber for exterior applications to be painted, including both faces and edges. Cut to required lengths and prime ends. Comply with requirements in Division 9 Section "Painting."
2. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and back-priming.

3.3 ROUGH CARPENTRY

A. **Installation, General:** Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

1. **Framing Standard:** Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated. Do not splice structural members between supports, unless otherwise indicated.
2. **Framing with Engineered Wood Products:** Install engineered wood products to comply with manufacturer's written instructions.
3. **Metal Framing Anchors:** Install metal framing to comply with manufacturer's written instructions.
4. **Provide blocking and framing** as indicated and as required to support facing materials, fixtures, specialty items, and trim. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
5. **Sort and select lumber** so that natural characteristics will not interfere with installation

or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

6. **Comply with AWPA M4** for applying field treatment to cut surfaces of preservative-treated lumber.

   a. Use inorganic boron for items that are continuously protected from liquid water.
   b. Use copper naphthenate for items not continuously protected from liquid water.

7. **Securely attach** rough carpentry work to substrate by anchoring and fastening as indicated, complying with Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

   a. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.
   b. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered. Comply with approved fastener patterns where applicable. Use finishing nails, unless otherwise indicated.

B. **Wood Ground, Sleeper, Blocking, and Nailer Installation:** Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

1. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
2. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

C. **Wood Furring Installation:** Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

1. **Furring to Receive Plywood or Hardboard Paneling:** Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring at 24 inches (610 mm) o.c.
2. **Furring to Receive Gypsum Board or Plaster Lath:** Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 16 inches (406 mm) o.c.

D. **Protection:** Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

1. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

3.4 FINISH CARPENTRY

A. **Installation, General:** Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements. Do not use manufactured units with defective surfaces, sizes, or patterns.

1. **Install finish carpentry level**, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

   a. *Scribe and cut* finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
   b. *Countersink fasteners*, fill surface flush, and sand where face fastening is unavoidable.
   c. *Install to tolerance* of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
   d. *Install stairs* with no more than 3/16-inch (4.7-mm) variation between adjacent treads and risers and with no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.
   e. *Coordinate finish carpentry* with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate finish carpentry.

B. **Standing and Running Trim Installation:** Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.

1. *Match color and grain pattern* across joints.
2. *Install trim* after gypsum board joint finishing operations are completed.
3. *Drill pilot holes* in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.
4. *Fit exterior joints* to exclude water. Apply flat grain lumber with bark side exposed to weather.

3.5 INTERIOR ARCHITECTURAL WOODWORK

A. **Installation:**

1. **Grade:** Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
2. **Assemble woodwork** and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
3. **Install woodwork level**, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
4. **Scribe and cut woodwork** to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
5. **Fire-Retardant-Treated Wood:** Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
6. **Anchor woodwork** to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
7. **Standing and Running Trim:** Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 36 inches (900 mm) long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

    a. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
    b. Install wall railings on indicated metal brackets securely fastened to wall framing.
    c. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).

8. **Paneling:** Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening, unless otherwise indicated.

    a. Install flush paneling with no more than 1/16 inch in 96-inch (1.5 mm in 2400-mm) vertical cup or bow and 1/8 inch in 96-inch (3 mm in 2400-mm) horizontal variation from a true plane.

9. **Cabinets:** Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

    a. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
    b. Maintain veneer sequence matching of cabinets with transparent finish.
    c. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with toggle bolts through metal backing or metal framing

behind wall finish.

10. **Countertops:** Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

    a. *Align adjacent* solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
    b. *Install countertops* with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
    c. *Secure backsplashes* to tops with concealed metal brackets at 16 inches (400 mm) o.c. and to walls with adhesive.
    d. *Calk space* between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."

11. **Touch up finishing work** specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.
12. **Refer to Division 9 Articles** for final finishing of installed architectural woodwork not indicated to be shop finished.

3.6 ADJUSTING AND CLEANING

A. **Adjusting:** Replace finish carpentry that is damaged or does not comply with requirements. Finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

B. **Repair damaged** and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

C. **Clean**, lubricate, and adjust hardware.

D. **Clean finish carpentry** and woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF DIVISION SIX

Paneling Installation:

1. **Plywood Paneling:** Select and arrange panels on each wall to minimize noticeable variations in grain character and color between adjacent panels. Leave 1/4-inch (6-mm) gap to be covered with trim at top, bottom, and openings. Install with uniform tight joints between panels.

    a. *Attach panels* to supports with manufacturer's recommended panel adhesive and fasteners. Space fasteners as recommended by panel manufacturer.
    b. *Conceal fasteners* to greatest practical extent.
    c. *Arrange panels* with grooves and joints over supports. Fasten to supports with nails of type and at spacing recommended by panel manufacturer. Use fasteners with prefinished heads matching groove color.

2. **Hardboard Paneling:** Install according to manufacturer's written recommendations. Leave 1/4-inch (6-mm) gap to be covered with trim at top, bottom, and openings. Butt adjacent panels with moderate contact.

    a. *Wood Stud or Furring Substrate:* Install with 1-inch (25-mm) annular-ring shank hardboard nails.
    b. *Plaster or Gypsum Board Substrate:* Install with 1-5/8-inch (41-mm) annular-ring shank hardboard nails.
    c. *Nailing:* Space nails 4 inches (100 mm) o.c. at panel perimeter and 8 inches (200 mm) o.c. at intermediate supports, unless otherwise required by manufacturer.

3. **Board Paneling:** Install according to manufacturer's written instructions. Arrange in random-width pattern suggested by manufacturer, unless boards or planks are of uniform width.

    a. Install in full lengths without end joints.
    b. Stagger end joints in random pattern to uniformly distribute joints on each wall.
    c. Install with uniform end joints with only end-matched (tongue-and-groove) joints within each field of paneling.
    d. Select and arrange boards on each wall to minimize noticeable variations in grain character and color between adjacent boards. Install with uniform tight joints between boards.
    e. Fasten paneling by blind nailing through tongues or fasten paneling with paneling system manufacturer's concealed clips. Fasten paneling to gypsum wallboard with panel adhesive.

DIVISION SEVEN - THERMAL & MOISTURE PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Division** specifies the following:

1. **Thermal Insulation:**

   a. Perimeter insulation under slabs-on-grade.
   b. Perimeter wall insulation (supporting backfill).
   c. Cavity-wall insulation.
   d. Concealed building insulation.
   e. Exposed building insulation.
   f. Loose-fill building insulation.
   g. Vapor retarders.
   h. Sound attenuation insulation.

2. **Sheet Metal Flashing and Trim**:

   a. Manufactured through-wall flashing.
   b. Manufactured reglets.
   c. Formed wall flashing and trim.
   d. Formed equipment support flashing.
   e. Formed overhead-piping safety pans.

3. **Joint Sealants:**

   a. **Exterior joints** in the following vertical surfaces and horizontal non-traffic surfaces:

      1) Construction joints in cast-in-place concrete.
      2) Joints between plant-precast architectural concrete units.
      3) Control and expansion joints in unit masonry.
      4) Joints in glass unit masonry assemblies.
      5) Joints between metal panels.
      6) Joints between different materials listed above.

7) Perimeter joints between materials listed above and frames of doors windows and louvers.
8) Other joints as indicated.

b. **Exterior joints** in the following horizontal traffic surfaces.

1) Control and expansion joints in brick pavers.
2) Isolation and contraction joints in cast-in-place concrete slabs.
3) Joints between plant-precast architectural concrete paving units.
4) Joints in stone paving units, including steps.
5) Joints between different materials listed above.
6) Other joints as indicated.

c. **Interior joints** in the following vertical surfaces and horizontal non-traffic surfaces.

1) Control and expansion joints on exposed interior surfaces of exterior walls.
2) Perimeter joints of exterior openings where indicated.
3) Tile control and expansion joints.
4) Vertical joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
5) Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
6) Joints between plumbing fixtures and adjoining walls, floors, and counters.
7) Other joints as indicated.

d. **Interior joints** in the following horizontal traffic surfaces.

1) Isolation joints in cast-in-place concrete slabs.
2) Control and expansion joints in stone flooring, brick flooring and tile flooring.
3) Other joints as indicated.

1.3 DEFINITIONS

A. **Mineral-Fiber Insulation:** Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

1.4 PERFORMANCE REQUIREMENTS

A. **Plenum Rating:** Provide glass-fiber insulation where indicated in ceiling plenums whose test performance is rated as follows for use in plenums as determined by testing identical products per "Erosion Test" and "Mold Growth and Humidity Test" described in UL 181, or on comparable tests from another standard acceptable to authorities having jurisdiction.

1. **Erosion Test Results:** Insulation shows no visible evidence of cracking, flaking, peeling, or delamination of interior surface of duct assembly, after testing for 4 hours at 2500-fpm (13-m/s) air velocity.
2. **Mold Growth and Humidity Test Results:** Insulation shows no evidence of mold growth, delamination, or other deterioration due to the effects of high humidity, after inoculation with Chaetomium globosium on all surfaces and storing for 60 days at 100 percent relative humidity in the dark.

B. **Sheet Metal Flashing and Trim:** Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

1. **Thermal Movements:** Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, over-stressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
2. **Temperature Change (Range):** 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
3. **Water Infiltration:** Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.5 SUBMITTALS

A. **Product Data:** For each type of product indicated.

B. **Product Data (Joint Sealants):** For each joint-sealant product indicated.

C. **Samples for Verification (Insulation):** Full-size units for each type of exposed insulation indicated.

D. **Samples for Initial Selection (Joint Sealants):** Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

E. **Samples for Verification (Joint Sealants):** For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

F. **Shop Drawings (Sheet Metal Flashing and Trim):** Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:

1. Identify material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
4. Details of expansion-joint covers, including showing direction of expansion and contraction.

G. **Product Test Reports:** Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.

H. **Research/Evaluation Reports:** For foam-plastic insulation.

I. **Product Certificates (Joint Sealants):** For each type of joint sealant and accessory, signed by product manufacturer.

J. **SWRI Validation Certificate:** For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.

K. **Qualification Data:** For Installer.

L. **Compatibility and Adhesion Test Reports:** From sealant manufacturer, indicating the following:

1. **Materials forming joint substrates** and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. **Interpretation of test results** and written recommendations for primers and substrate preparation needed for adhesion.
3. **Report whether sealant** in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
4. **Evaluation of Preconstruction Field-Adhesion-Test Results:** Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.6 QUALITY ASSURANCE

A. **Source Limitations:** Obtain each type of building insulation through one source from a single manufacturer.

B. **Fire-Test-Response Characteristics:** Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to

authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. **Surface-Burning Characteristics:** ASTM E 84.
2. **Fire-Resistance Ratings:** ASTM E 119.
3. **Combustion Characteristics:** ASTM E 136.

C. **Sheet Metal Flashing and Trim Standard:** Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1. **Copper Standard:** Comply with CDA's "Copper in Architecture Handbook."

D. **Mockups:** Build mockups when specified to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Approval of mockups is for other material and construction qualities specifically approved by AOC in writing.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. **Protect insulation materials** from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. **Protect plastic insulation** as follows:

1. **Do not expose** to sunlight, except to extent necessary for period of installation and concealment.
2. **Protect against ignition** at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. **Complete installation** and concealment of plastic materials as rapidly as possible in each area of construction.

C. **Deliver sheet metal flashing materials** and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

D. **Unload, store, and install sheet metal flashing materials** and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

E. **Stack materials** on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.8 PROJECT CONDITIONS

A. **Do not proceed** with installation of joint sealants under the following conditions:

1. **When ambient** and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. **When joint** substrates are wet.
3. **Where joint widths** are less than those allowed by joint-sealant manufacturer for applications indicated.
4. **Contaminants** capable of interfering with adhesion have not yet been removed from joint substrates.

1.9 WARRANTY

A. **Sealant Installer's Warranty:** Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. **Warranty Period:** 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 THERMAL INSULATION

A. **Extruded-Polystyrene Board Insulation:** ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively.

1. **Type IV**, 1.60 lb/cu. ft. (26 kg/cu. m), unless otherwise indicated.

B. **Molded-Polystyrene Board Insulation:** ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:

1. **Type I**, 0.90 lb/cu. ft. (15 kg/cu. m).

C. **Foil-Faced, Polyisocyanurate Board Insulation:** ASTM C 1289, Type I, Class 1 or 2, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, based on tests performed on un-faced core on thicknesses up to 4 inches (101 mm).

D. **Cellular-glass Insulation:** ASTM C 552 Type I (flat block) with un-faced insulation passing ASTM E 136 for combustion characteristics.

E. **Glass-fiber Board Insulation:**

1. **Un-faced, Flexible Glass-Fiber Board Insulation:** ASTM C 612, Type IA; ASTM C 553, Types I, II, and III; or ASTM C 665, Type I; with maximum flame-

spread and smoke-developed indexes of 25 and 50, respectively, passing ASTM E 136 for combustion characteristics; and nominal density of not less than 1.5 lb/cu. ft. (24 kg/cu. m) nor more than 1.7 lb/cu. ft. (27 kg/cu. m), thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C).

2. **Foil-Faced, Flexible Glass-Fiber Board Insulation:** ASTM C 612, Type IA or ASTM C 553, Types I, II, and III; faced on 1 side with foil-scrim-kraft vapor retarder; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; and nominal density of not less than 1.5 lb/cu. ft. (24 kg/cu. m) nor more than 1.7 lb/cu. ft. (27 kg/cu. m), thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C).
3. **Un-faced, Glass-Fiber Board Insulation:** ASTM C 612, Type IA or Types IA and IB; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; and nominal density of 2.25 lb/cu. ft. (36 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
4. **Foil-Faced, Glass-Fiber Board Insulation:** ASTM C 612, Type IA or Types IA and IB; faced on 1 side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; and nominal density of 2.25 lb/cu. ft. (36 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
5. **Glass-Mat-Faced, Glass-Fiber Board Insulation:** ASTM C 612, Type IA or Types IA and IB; faced on 1 side with black glass-fiber mat or black polymer finish; maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; and nominal density of 2.25 lb/cu. ft. (36 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).

G. **Glass-fiber Blanket Insulation:**

1. **Un-faced, Glass-Fiber Blanket Insulation:** ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics. Provide thermal resistances indicated on the drawings.
2. **Faced, Glass-Fiber Blanket Insulation:** ASTM C 665, Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil-scrim-kraft, foil-scrim, or foil-scrim-polyethylene vapor-retarder membrane on 1 face. Provide thermal resistances indicated on the drawings.

H. **Unfaced, Slag-Wool-Fiber/Rock-Wool-Fiber Blanket Insulation:** ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics. Provide thermal resistances indicated on the drawings.

I. **Glass-Fiber Loose-Fill Insulation:** ASTM C 764, Type I for pneumatic application or Type II for poured application; with maximum flame-spread and smoke-developed indexes of 5.

J. **Vapor Retarders:**

1. **Polyethylene Vapor Retarders:** ASTM D 4397, 6 mils (0.15 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
2. **Fire-Retardant, Reinforced-Polyethylene Vapor Retarders:** 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either non-woven grid of nylon cord or polyester scrim and weighing not less than 22 lb/1000 sq. ft. (10 kg/100 sq. m), with maximum permeance rating of 0.1317 perm (7.56 ng/Pa x s x sq. m) and with flame-spread and smoke-developed indexes of not more than 5 and 60, respectively.
3. **Foil-Polyester-Film Vapor Retarders:** 2 layers of 0.5-mil- (0.013-mm-) thick polyester film laminated to an inner layer of 1-mil- (0.025-mm-) thick aluminum foil, with maximum water-vapor transmission rate in flat condition of 0.0 g/h x sq. m and with maximum flame-spread and smoke-developed indexes of 5.
4. **Vapor-Retarder Tape:** Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
5. **Vapor-Retarder Fasteners:** Pancake-head, self-tapping steel drill screws; with fender washers.
6. **Single-Component Non-sag Urethane Sealant:** ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.
7. **Adhesive for Vapor Retarders:** Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor retarders securely to substrates indicated.

K. **Auxiliary Insulating Materials:**

1. **Vapor-Retarder Tape:** Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.
2. **Adhesive for Bonding Insulation:** Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
3. **Asphalt Coating for Cellular-Glass Block Insulation:** Cutback asphalt or asphalt emulsion of type recommended by manufacturer of cellular-glass block insulation.

L. **Insulation Fasteners:** Provide insulation manufacturer's recommended fasteners.

2.2 SHEET METAL FLASHING AND TRIM

A. **Sheet Metals:**

1. **Copper Sheet:** ASTM B 370, Temper H00 or H01, cold-rolled copper sheet.
2. **Lead-Coated Copper Sheet:** ASTM B 101, Temper H00 and H01, cold-rolled copper sheet, of weight (thickness) indicated below, coated both sides with lead weighing not less than 12 lb/100 sq. ft. (0.59 kg/sq. m) nor more than 15 lb/100 sq. ft. (0.73 kg/sq. m) of copper sheet (total weight of lead applied equally to both sides).

3. **Aluminum Sheet:** ASTM B 209 (ASTM B 209M), Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:

   a. *Mill Finish:* Standard one-side bright.
   b. *Alclad Finish:* Metallurgically bonded surfacing to both sides, forming a composite aluminum sheet with reflective luster.
   c. *Factory Prime Coating:* Where painting after installation is indicated, provide pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat; with a minimum dry film thickness of 0.2 mil (0.005 mm).
   d. *High-Performance Organic Finish:* AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

      1) *Fluoropolymer 2-Coat System:* Manufacturer's standard 2-coat, thermo-cured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605. Color as selected by AOC from manufacturer's full range.

   e. *Anodized Finish:* Apply the following coil-anodized finish:

      1) *Class I, Clear Anodic Finish:* AA-M12C22A41 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
      2) *Class I, Color Anodic Finish:* AA-M12C22A44 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611. Color as indicated and approved by the AOC.

4. **Stainless-Steel Sheet:** ASTM A 240/A 240M, Type 304, finish: No. 2D (dull, cold rolled).
5. **Zinc-Tin Alloy-Coated Stainless-Steel Sheet:** ASTM A 240/A 240M, Type 304, dead-soft, fully annealed stainless-steel sheet, coated on both sides with a zinc-tin alloy (50 percent zinc, 50 percent tin).

B. **Underlayment Materials:**

1. **Polyethylene Sheet:** 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397.
2. **Felts:** ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
3. **Slip Sheet:** Rosin-sized paper, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).

C. **Miscellaneous Materials:** Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

1. **Fasteners:** Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

    a. *Nails for Copper Sheet:* Copper, hardware bronze, or Series 300 stainless steel, 0.109 inch (2.8 mm) minimum and not less than 7/8 inch (22 mm) long, barbed with large head.
    b. *Exposed Fasteners:* Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
    c. *Fasteners for Flashing and Trim:* Blind fasteners or self-drilling screws, gasketed, with hex washer head.
    d. *Blind Fasteners:* High-strength aluminum or stainless-steel rivets.
    e. *Spikes and Ferrules:* Same material as gutter; with spike with ferrule matching internal gutter width.

2. **Solder for Copper:** ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
3. **Solder for Lead-Coated Copper:** ASTM B 32, Grade Sn60, 60 percent tin and 40 percent lead.
4. **Solder for Stainless Steel:** ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
5. **Solder for Zinc-Tin Alloy-Coated Stainless Steel:** ASTM B 32, 100 percent tin.
6. **Solder for Zinc:** ASTM B 32, 60 percent lead and 40 percent tin with low antimony, as recommended by manufacturer.
7. **Sealing Tape:** Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, non-sag, non-toxic, non-staining tape.
8. **Elastomeric Sealant:** ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
9. **Butyl Sealant:** ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
10. **Epoxy Seam Sealer:** Two-part, non-corrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
11. **Bituminous Coating:** Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
12. **Asphalt Roofing Cement:** ASTM D 4586, asbestos free, of consistency required for application.

D. **Fabrication, General:** Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

1. **Fabricate sheet metal flashing and trim** in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. **Fabricate sheet metal flashing and trim** without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

   a. *Seams for Aluminum:* Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   b. *Seams for Other Than Aluminum:* Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

3. **Sealed Joints:** Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
4. **Expansion Provisions:** Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric or butyl sealant concealed within joints.
5. **Conceal fasteners** and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
6. **Fabricate cleats** and attachment devices from same material as accessory being anchored or from compatible, non-corrosive metal.

   a. *Thickness:* As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

E. **Wall Sheet Metal Fabrications:**

1. **Through-Wall Flashing:** Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12 foot (3.6 m) long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond each side of wall openings. Form with 2-inch- (50-mm-) high end dams. Fabricate from the following material:

   a. *Copper:* 16 oz./sq. ft. (0.55 mm thick).
   b. *Lead-Coated Copper:* 17.2 oz./sq. ft. (0.60 mm thick).
   c. *Stainless Steel:* 0.0156 inch (0.4 mm) thick.

2. **Openings Flashing in Frame Construction:** Fabricate head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high end dams. Fabricate from the following material:

a. *Copper:* 16 oz./sq. ft. (0.55 mm thick).
b. *Lead-Coated Copper:* 17.2 oz./sq. ft. (0.60 mm thick).
c. *Aluminum:* 0.0320 inch (0.8 mm) thick.
d. *Stainless Steel:* 0.0156 inch (0.4 mm) thick.

3. **Wall Expansion-Joint Cover:** Fabricate from the following material:

a. *Copper:* 16 oz./sq. ft. (0.55 mm thick).
b. *Lead-Coated Copper:* 17.2 oz./sq. ft. (0.60 mm thick).
c. *Aluminum:* 0.040 inch (1.0 mm) thick.
d. *Stainless Steel:* 0.0187 inch (0.5 mm) thick.

F. **Miscellaneous Sheet Metal Fabrications:**

1. **Equipment Support Flashing:** Fabricate from the following material:

a. *Copper:* 16 oz./sq. ft. (0.55 mm thick).
b. *Lead-Coated Copper:* 17.2 oz./sq. ft. (0.60 mm thick).
c. *Stainless Steel:* 0.0187 inch (0.5 mm) thick.
d. *Galvanized Steel:* 0.0276 inch (0.7 mm) thick.
e. *Pre-painted, Metallic-Coated Steel (Exposed Exterior):* 0.0276 inch (0.7 mm) thick.

2. **Overhead-Piping Safety Pans:** Fabricate from the following material:

a. *Stainless Steel:* 0.0250 inch (0.65 mm) thick.
b. *Galvanized Steel:* 0.0396 inch (1.0 mm) thick.

G. **Finishes:** Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1. **Appearance of Finished Work:** Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.3 JOINT SEALANTS

A. **Materials, General:**

1. **Compatibility:** Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and

application, as demonstrated by sealant manufacturer, based on testing and field experience.

2. **VOC Content of Interior Sealants:** Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

   a. *Sealants:* 250 g/L.
   b. *Sealant Primers for Nonporous Substrates:* 250 g/L.
   c. *Sealant Primers for Porous Substrates:* 775 g/L.

3. **Colors of Exposed Joint Sealants:** As selected by Architect from manufacturer's full range.

B. **Elastomeric Joint Sealants:**

1. **General:** Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

   a. *Stain-Test-Response Characteristics:* Where elastomeric sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
   b. *Suitability for Immersion in Liquids:* Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.
   c. *Suitability for Contact with Food:* Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

2. **Multi-component Non-sag Polysulfide Sealant**:

   a. *Type and Grade:* M (multi-component) and NS (nonsag).
   b. *Class:* 25.
   c. *Use Related to Exposure:* NT (non-traffic).
   d. *Uses Related to Joint Substrates:* M, G, A, and, as applicable to joint substrates indicated, O.

3. **Single-Component Pourable Neutral-Curing Silicone Sealant:**

   a. *Type and Grade:* S (single component) and P (pourable).
   b. *Class:* 100/50.
   c. *Use Related to Exposure:* NT and T (traffic).

d. *Uses Related to Joint Substrates:* M, A, and O, as applicable to joint substrates indicated.

4. **Single-Component Acid-Curing Silicone Sealant:**

a. *Type and Grade:* S (single component) and NS (non-sag).
b. *Class:* 25.
c. *Use Related to Exposure:* NT (non-traffic).
d. *Uses Related to Joint Substrates:* G, A, and, as applicable to joint substrates indicated, O.

5. **Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:**

a. *Type and Grade:* S (single component) and NS (non-sag).
b. *Class:* 25.
c. *Use Related to Exposure:* NT (non-traffic).
d. *Uses Related to Joint Substrates:* M, G, A, and, as applicable to joint substrates indicated, O.

6. **Single-Component Mildew-Resistant Acid-Curing Silicone Sealant:**

a. *Type and Grade:* S (single component) and NS (non-sag).
b. *Class:* 25.
c. *Use Related to Exposure:* NT (non-traffic).
d. *Uses Related to Joint Substrates:* G, A, and, as applicable to joint substrates indicated, O.

7. **Multi-component Non-sag Urethane Sealant:**

a. *Type and Grade:* M (multi-component) and NS (non-sag).
b. *Class:* 50.
c. *Use[s] Related to Exposure:* NT (non-traffic) and T (traffic).
d. *Uses Related to Joint Substrates:* M, G, A, and, as applicable to joint substrates indicated, O.

8. **Multi-component Non-sag Immersible Urethane Sealant:**

a. *Type and Grade:* M (multi-component) and NS (non-sag).
b. *Class:* 25.
c. *Use[s] Related to Exposure:* T (traffic) and I (immersible), Class 1.
d. *Uses Related to Joint Substrates:* M, G, A, and, as applicable to joint substrates indicated, O.

9. **Multi-component Pourable Urethane Sealant:**

a. *Type and Grade:* M (multi-component) and P (pourable).

b. *Class:* 25.
c. *Use Related to Exposure:* T (traffic).
d. *Uses Related to Joint Substrates:* M, A, and, as applicable to joint substrates indicated, O.

10. **Single-Component Non-sag Urethane Sealant:**

a. *Type and Grade:* S (single component) and NS (non-sag).
b. *Class:* 25.
c. *Uses Related to Exposure:* T (traffic) and NT (non-traffic).
d. *Uses Related to Joint Substrates:* M, G, A, and, as applicable to joint substrates indicated, O.

11. **Single-Component Non-sag Urethane Sealant:**

a. *Type and Grade:* S (single component) and NS (non-sag).
b. *Class:* 25.
c. *Use Related to Exposure:* NT (non-traffic).
d. *Uses Related to Joint Substrates:* M, G, A, and, as applicable to joint substrates indicated, O.

12. **Single-Component Pourable Urethane Sealant:**

a. *Type and Grade:* S (single component) and P (pourable).
b. *Class:* 25.
c. *Uses Related to Exposure:* T (traffic) and NT (non-traffic).
d. *Uses Related to Joint Substrates:* M, G,]A, and, as applicable to joint substrates indicated, O.

C. **Solvent-release Joint Sealants:**

1. **Acrylic-Based Solvent-Release Joint Sealant:** Comply with ASTM C 1311 or FS TT-S-00230.
2. **Butyl-Rubber-Based Solvent-Release Joint Sealant:** Comply with ASTM C 1085.

D. **Latex Joint Sealants:** Comply with ASTM C 834, Type P, Grade NF.

E. **Acoustical Sealant for Exposed and Concealed Joints:** Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834 and the product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

F. **Joint-sealant Backing:** Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. **Cylindrical Sealant Backings:** ASTM C 1330, Type as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
2. **Bond-Breaker Tape:** Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

G. **Miscellaneous Materials:**

1. **Primer:** Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
2. **Cleaners for Nonporous Surfaces:** Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
3. **Masking Tape:** Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 THERMAL INSULATION

A. **Examination:** Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. **Preparation:** Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

C. **Installation, General:**

1. **Comply with insulation manufacturer's** written instructions applicable to products and application indicated.
2. **Install insulation** that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
3. **Extend insulation** in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
4. **Water-Piping Coordination:** If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

5. **For preformed insulating units**, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

D. **Installation of Perimeter and Under-slab Insulation:**

1. **On vertical surfaces**, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

   a. *If not otherwise indicated*, extend insulation a minimum of 24 inches (610 mm) below exterior grade line.

2. **On horizontal surfaces**, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
3. **Protect below-grade insulation** on vertical surfaces from damage during backfilling by applying protection course with joints butted. Set in adhesive according to insulation manufacturer's written instructions.
4. **Protect top surface** of horizontal insulation from damage during concrete work by applying protection course with joints butted.

E. **Installation of Cavity-wall Insulation:**

1. **On units of foam-plastic board insulation**, install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face, and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates indicated.

   a. *Supplement adhesive attachment* of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Division 04.

2. **Install units** of cellular-glass insulation with closely fitting joints using method indicated:

   a. *Gob Method:* Apply 4 gobs of adhesive per unit and set units firmly against inside wythe of masonry or other construction as shown. Apply gobs at each corner; spread gobs to form pads 4 inches (101 mm) in diameter by 1/4 inch (6 mm) thick.
   b. *Serrated-Trowel Method:* Apply adhesive to entire surface of each cellular-glass insulation unit with serrated trowel complying with insulation manufacturer's written instructions.
   c. *Coat edges* of insulation units with full bed of adhesive to seal joints between insulation and between insulation and adjoining construction. Coat exterior face (cold face) of installed cellular-glass block insulation course with asphalt coating.

F. **Installation of General Building Insulation:**

1. **Apply insulation units** to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
2. **Seal joints** between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
3. **Set vapor-retarder-faced units** with vapor retarder to side indicated of construction, unless otherwise indicated. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
4. **Install mineral-fiber insulation** in cavities formed by framing members according to the following requirements:

    a. *Use insulation widths* and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
    b. *Place insulation* in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
    c. *Maintain 3-inch* (76-mm) clearance of insulation around recessed lighting fixtures.
    d. *Install eave ventilation troughs* between roof framing members in insulated attic spaces at vented eaves.
    e. *For metal-framed wall cavities* where cavity heights exceed 96 inches (2438 mm), support un-faced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.
    f. *For wood-framed construction*, install mineral-fiber blankets according to ASTM C 1320 and as follows:

        1) With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
        2) With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

5. **Install board insulation** on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

    a. *Fasten insulation anchors* to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
    b. *Apply insulation* standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.

c. *After adhesive has dried*, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
d. *Where insulation* will not be covered by other building materials, apply capped washers to tips of spindles.

6. **Place loose-fill insulation** into spaces indicated to comply with ASTM C 1015. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
7. **Stuff glass-fiber** loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

G. **Installation of Insulation in Ceilings for Sound Attenuation:** Install 3-inch- (76-mm-) thick, un-faced glass or slag-wool-fiber/rock-wool-fiber blanket insulation over suspended ceilings at partitions in a width that extends insulation 48 inches (1219 mm) on either side of partition.

H. **Installation of Vapor Retarders:** Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

1. **Seal vertical joints** in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (400 mm) o.c.
2. **Before installing vapor retarder**, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
3. **Firmly attach vapor retarders** to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.
4. **Seal joints** caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
5. **Repair tears or punctures** in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

I. **Protection:** Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.2 SHEET METAL FLASHING AND TRIM

A. **Examination:** Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored. Proceed with installation only after unsatisfactory conditions have been corrected.

B. **Installation, General:** Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system. Torch cutting of sheet metal flashing and trim is not permitted.

1. **Metal Protection:** Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

    a. *Coat side* of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
    b. *Underlayment:* Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
    c. *Bed flanges* in thick coat of asphalt roofing cement where required for waterproof performance.

2. **Install** exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
3. **Install sheet metal flashing and trim** true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and butyl sealant.
4. **Install sheet metal flashing and trim** to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
5. **Expansion Provisions:** Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
6. **Fasteners:** Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

    a. *Galvanized or Pre-painted, Metallic-Coated Steel:* Use stainless-steel fasteners.
    b. *Aluminum:* Use aluminum or stainless-steel fasteners.
    c. *Copper:* Use copper, hardware bronze, or stainless-steel fasteners.
    d. *Stainless Steel:* Use stainless-steel fasteners.

7. **Seal joints** with butyl sealant as required for watertight construction.

    a. *Where sealant-filled joints* are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
    b. *Prepare joints* and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

8. **Soldered Joints:** Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm) except where pre-tinned surface would show in finished Work.

    a. *Do not solder* pre-painted, metallic-coated steel and aluminum sheet.
    b. *Stainless-Steel Soldering:* Pre-tin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.
    c. *Copper Soldering:* Tin uncoated copper surfaces at edges of sheets using solder recommended for copper work.
    d. *Where surfaces* to be soldered are lead coated, do not tin edges, but wire brush lead coating before soldering.
    e. *Do not use* open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

9. **Aluminum Flashing:** Rivet or weld joints in uncoated aluminum where necessary for strength.

C. **Roof Flashing Installation:**

1. **General:** Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
2. **Roof Edge Flashing:** Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 16-inch (400-mm) centers.
3. **Copings:** Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.

    a. *Interlock exterior bottom edge* of coping with continuous cleats anchored to substrate at 24-inch (600-mm) centers or other spacing as indicated.

b. *Anchor interior leg* of coping with screw fasteners and washers at 24-inch (600-mm) centers or other spacing as indicated.

4. **Pipe or Post Counter-flashing:** Install counter-flashing umbrella with close-fitting collar with top edge flared for butyl sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
5. **Counter-flashing:** Coordinate installation of counter-flashing with installation of base flashing. Insert counter-flashing in reglets or receivers and fit tightly to base flashing. Extend counter-flashing 4 inches (100 mm) over base flashing. Lap counter-flashing joints a minimum of 4 inches (100 mm) and bed with butyl sealant.

   a. *Secure* in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.

6. **Roof-Penetration Flashing:** Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:

   a. *Turn lead flashing* down inside vent piping, being careful not to block vent piping with flashing.
   b. *Seal with butyl sealant* and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

D. **Wall Flashing Installation:**

1. **General:** Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
2. **Through-Wall Flashing:** Installation of through-wall flashing is specified in Division 04.
3. **Reglets:** Installation of reglets is specified in Division 03 or 04, as applicable.
4. **Openings Flashing in Frame Construction:** Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

E. **Miscellaneous Flashing Installation:**

1. **Overhead-Piping Safety Pans:** Suspend pans from pipe and install drain line to plumbing waste or drain line.
2. **Equipment Support Flashing:** Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with butyl sealant to equipment support member.

F. **Flashing and Sheet Metal Cleaning and Protection:**

1. **Clean exposed metal surfaces** of substances that interfere with uniform oxidation and weathering.

2. **Clean and neutralize** flux materials. Clean off excess solder and sealants.
3. **Remove temporary protective coverings** and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
4. **Replace sheet metal flashing** and trim that have been damaged or that have deteriorated beyond successful repair by finish touch-up or similar minor repair procedures.

3.3 JOINT SEALANTS

A. **Examination:** Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. **Preparation:**

1. **Surface Cleaning of Joints:** Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

   a. *Remove all foreign material* from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
   b. *Clean porous joint substrate surfaces* by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following: concrete, masonry, and unglazed surfaces of ceramic tile.
   c. *Remove laitance* and form-release agents from concrete.
   d. *Clean non-porous surfaces* with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following: metal, glass, porcelain enamel, and glazed surfaces of ceramic tile.

2. **Joint Priming:** Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
3. **Masking Tape:** Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such

contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

C. **Installation of Joint Sealants:** Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

1. **Sealant Installation Standard:** Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
2. **Acoustical Sealant Application Standard:** Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
3. **Install sealant backings** of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

   a. *Do not leave gaps* between ends of sealant backings.
   b. *Do not stretch*, twist, puncture, or tear sealant backings.
   c. *Remove absorbent sealant backings* that have become wet before sealant application and replace them with dry materials.

4. **Install bond-breaker tape** behind sealants where sealant backings are not used between sealants and backs of joints.
5. **Install sealants** using proven techniques that comply with the following and at the same time backings are installed:

   a. *Place sealants* so they directly contact and fully wet joint substrates.
   b. *Completely fill recesses* in each joint configuration.
   c. *Produce uniform*, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

6. **Tooling of Non-sag Sealants:** Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

   a. *Remove excess sealant* from surfaces adjacent to joints.
   b. *Use tooling agents* that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   c. *Provide concave joint* configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
   d. *Provide flush joint* configuration where indicated per Figure 5B in ASTM C 1193.
   e. *Provide recessed joint* configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193. Use masking tape to protect surfaces adjacent to recessed tooled joints.

D. **Joint-sealant Schedule:**

1. **Exterior vertical and horizontal non-traffic construction joints in cast-in-place concrete:** Single-component neutral-curing silicone sealant; color as selected by AOC from manufacturer's full range.
2. **Exterior horizontal non-traffic and traffic isolation and contraction joints in cast-in-place concrete slabs:** Multi-component non-sag urethane sealant, multi-component pourable urethane sealant, or single-component pourable urethane sealant; color as selected by AOC from manufacturer's full range.
3. **Exterior vertical and horizontal non-traffic joints between plant-precast architectural concrete units:** Multi-component non-sag neutral-curing silicone sealant or Single-component neutral-curing silicone sealant; color as selected by AOC from manufacturer's full range.
4. **Exterior vertical control and expansion joints in unit masonry:** Single-component neutral-curing silicone sealant; color as selected by AOC from manufacturer's full range.
5. **Exterior joints in dimension stone cladding:** Multi-component non-sag polysulfide sealant or single-component neutral-curing silicone sealant; color as selected by AOC from manufacturer's full range.
6. **Exterior butt joints between metal panels:** Single-component neutral-curing silicone sealant; color as selected by AOC from manufacturer's full range.
7. **Exterior vertical joints between different materials listed above:** Single-component neutral-curing silicone sealant; color as selected by AOC from manufacturer's full range.
8. **Exterior perimeter joints between wall surfaces (unit masonry, stone, etc.) and frames of doors, windows, and louvers:** Single-component neutral-curing silicone sealant; color as selected by AOC from manufacturer's full range.
9. **Exterior control and expansion joints in ceilings and other overhead surfaces:** Single-component neutral-curing silicone sealant; color as selected by AOC from manufacturer's full range.
10. **Exterior control and expansion joints in horizontal traffic surfaces of brick pavers, ceramic tile, and stone paving units:** Multi-component non-sag urethane sealant, multi-component pourable urethane sealant, or single-component pourable urethane sealant; color as selected by AOC from manufacturer's full range.
11. **Vertical control and expansion joints on exposed interior surfaces of exterior walls:** Single-component neutral-curing silicone sealant; color as selected by AOC from manufacturer's full range.
12. **Interior perimeter joints of exterior openings:** Latex sealant; color as selected by AOC from manufacturer's full range.
13. **Interior ceramic, dimension stone, tile expansion, control, contraction, and isolation joints in horizontal traffic surfaces:** Multi-component non-sag urethane sealant or multi-component pourable urethane sealant; color as selected by AOC from manufacturer's full range.
14. **Interior joints between plumbing fixtures and adjoining walls, floors, and counters:** Single-component mildew-resistant acid-curing silicone sealant; color as selected by AOC from manufacturer's full range.
15. **Vertical joints on exposed surfaces of interior unit masonry and concrete walls and partitions:** Latex sealant; color as selected by AOC from manufacturer's full range.

16. **Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances:** Latex sealant; color as selected by AOC from manufacturer's full range.
17. **Interior control, expansion, and isolation joints in horizontal traffic surfaces of dimension stone, brick flooring, and tile flooring:** Multi-component non-sag urethane sealant or multi-component pourable urethane sealant; color as selected by AOC from manufacturer's full range.

END OF DIVISION SEVEN

DIVISION EIGHT - OPENINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **Section Includes:**

1. Standard hollow metal doors and frames.
2. Solid-core flush wood doors and transom panels with wood-veneer faces.
3. Exterior stile and rail wood doors and sidelites.
4. Interior stile and rail wood doors.
5. Interior fire-rated wood door and sidelite frames.
6. Factory fitting stile and rail wood doors to frames and factory machining for hardware.
7. Access doors and frames for walls and ceilings.
8. Exterior and interior aluminum-framed storefronts.
9. Exterior and interior manual-swing aluminum doors.
10. Glazing.

B. **Related Sections:**

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.3 DEFINITIONS

A. **Minimum Thickness:** Minimum thickness of base metal without coatings.

B. **Standard Hollow Metal Work**: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

A. **Product Data:** For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes.

1. For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings.

B. **Shop Drawings:** Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.
10. Indicate requirements for veneer matching.
11. Indicate doors to be factory finished and finish requirements.
12. Indicate fire-protection ratings for fire-rated doors.

C. **Door Schedule:** Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

D. **Product Test Reports:** Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

E. **Wood Door Samples for Verification:** Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish.

1.5 QUALITY ASSURANCE

A. **Source Limitations:** Obtain hollow metal work from single source from single manufacturer.

B. **Fire-Rated Door Assemblies:** Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252.

C. **Fire-Rated, Borrowed-Light Frame Assemblies:** Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.

D. **Smoke-Control Door Assemblies:** Comply with NFPA 105 or UL 1784.

E. **Flush Wood Door Quality Standard:** In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

F. **Quality Standard for Doors of Special Design and Construction:** Comply with AWI's "Architectural Woodwork Quality Standards" unless more stringent requirements are specified. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

G. **Quality Standard for Doors of Stock Design and Construction:** Comply with WDMA I.S.6, "Industry Standard for Wood Stile and Rail Doors," unless more stringent requirements are specified.

H. **Fire-Rated Access Doors and Frames:** Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for vertical access doors and frames.

I. **Glazing Installer Qualifications:** An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

J. **Source Limitations for Glass:** Obtain the following through one source from a single manufacturer for each glass type.

K. **Insulating-Glass Certification Program:** Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.
2. Associated Laboratories, Inc.

1.6 DELIVERY, STORAGE, AND HANDLING

A. **Deliver hollow metal work** palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic. Provide additional protection to prevent damage to finish of factory-finished units.

B. **Deliver welded frames** with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. **Store hollow metal work** under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.

1.7 PROJECT CONDITIONS

A. **Field Measurements:** Verify actual dimensions of openings by field measurements before fabrication.

B. **Environmental Limitations:** Do not deliver or install doors until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.8 COORDINATION

A. **Coordinate installation of anchorages** for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 HOLLOW METAL DOORS

A. **Door Materials:**

1. **Cold-Rolled Steel Sheet:** ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
2. **Hot-Rolled Steel Sheet:** ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
3. **Metallic-Coated Steel Sheet:** ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
4. **Frame Anchors:** ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.

    a. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

5. **Inserts, Bolts, and Fasteners:** Hot-dip galvanized according to ASTM A 153/A 153M.
6. **Powder-Actuated Fasteners in Concrete:** Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
7. **Grout:** ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

8. **Mineral-Fiber Insulation:** ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
9. **Glazing:** Comply with requirements in Division 08 Section "Glazing."
10. **Bituminous Coating:** Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

B. **Standard Hollow Metal Doors:**

1. **General:** Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

   a. *Design:* Flush panel.
   b. *Core Construction:* Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.

      1) Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
      2) Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 4.0 deg F x h x sq. ft./Btu (0.704 K x sq. m/W) when tested according to ASTM C 1363.

   c. *Vertical Edges for Single-Acting Doors:* Square edge.
   d. *Vertical Edges for Double-Acting Doors:* Round vertical edges with 2-1/8-inch (54-mm) radius.
   e. *Top and Bottom Edges:* Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.
   f. *Tolerances:* Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

2. **Exterior Doors:** Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

   a. *Level 2* and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).

3. **Interior Doors:** Face sheets fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated. Width all doors 1-3/4 inches (44.5 mm). Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

a. *Office and Corridor Doors:* Level 1 and Physical Performance Level C (Standard Duty), Model 1 (Full Flush).
b. *Egress Doors/Assembly Areas:* Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).

4. **Hardware Reinforcement:** Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

C. **Standard Hollow Metal Frames:**

1. **General:** Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

2. **Exterior Frames:** Fabricated from metallic-coated steel sheet. Fabricate frames with mitered or coped corners. Fabricate frames as full profile welded unless otherwise indicated.

a. *Frames for Level 1 Steel Doors:* 0.042-inch- (1.0-mm-) thick steel sheet.
b. *Frames for Level 2 Steel Doors:* 0.053-inch- (1.3-mm-) thick steel sheet.

3. **Interior Frames:** Fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated. Fabricate frames with mitered or coped corners.

a. *Office and Corridor Doors:* Fabricate frames as knocked down unless otherwise indicated. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
b. *Egress Doors/Assembly Areas:* Fabricate frames as full profile welded unless otherwise indicated.
c. *Frames for Level 1 Steel Doors:* 0.042-inch- (1.0-mm-) thick steel sheet.
d. *Frames for Level 2 Steel Doors:* 0.053-inch- (1.3-mm-) thick steel sheet.
e. *Frames for Wood Doors:* 0.053-inch- (1.3-mm-) thick steel sheet.
f. *Frames for Borrowed Lights:* Same as adjacent door frame.

4. **Hardware Reinforcement:** Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.2 FLUSH WOOD DOORS

A. **Door Construction, General**: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde. WDMA I.S.1-A Performance Grade:

1. **Heavy Duty:** Unless otherwise indicated.
2. **Extra Heavy Duty:** Public toilets, janitor's closets, assembly spaces, exits, and where indicated.

3. **Standard Duty:** Closets (not including janitor's closets), private toilets, and where indicated.

B. **Particleboard-Core Doors:** Core: ANSI A208.1, Grade LD-1 or Grade LD-2. Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices. Provide wood blocking in particleboard-core doors as follows:

1. **5-inch** (125-mm) top-rail blocking, in doors indicated to have closers.
2. **5-inch** (125-mm) bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
3. **5-inch** (125-mm) midrail blocking, in doors indicated to have exit devices.

C. **Structural-Composite-Lumber-Core Doors:** WDMA I.S.10.

1. **Screw Withdrawal, Face:** 700 lbf (3100 N).
2. **Screw Withdrawal, Edge:** 400 lbf (1780 N).

D. **Fire-Protection-Rated Doors:** Provide core specified or mineral core as needed to provide fire-protection rating indicated. Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.

1. **Pairs:** Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Comply with specified requirements for exposed edges.

E. **Mineral-Core Doors:** Noncombustible mineral product core complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated. At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges. Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as follows:

1. **5-inch** (125-mm) top-rail blocking.
2. **5-inch** (125-mm) bottom-rail blocking, in doors indicated to have protection plates.
3. **5-inch** (125-mm) midrail blocking, in doors indicated to have armor plates or exit devices.

F. **Veneered-faced Doors for Transparent Finish (Interior):**

1. **Grade:** Premium, with Grade A faces.
2. **Species:** As indicated or to match existing indicated to remain.
3. **Cut:** As indicated or to match existing indicated to remain.
4. **Match between Veneer Leaves:** Book match.
5. **Assembly of Veneer Leaves on Door Faces:** Center-balance match.

6. **Pair and Set Match:** Provide for doors hung in same opening or separated only by mullions.
7. **Room Match:** Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 10 feet (3 m) or more.
8. **Transom Match:** Continuous match.
9. **Blueprint Match:** Where indicated, provide doors with faces produced from same flitches as adjacent wood paneling and arranged to provide blueprint match with wood paneling.
10. **Exposed Vertical Edges:** Same species as faces or a compatible species
11. **Construction:** Seven plies, either bonded or non-bonded construction.

G. **Louvers and Light Frames:**

1. **Metal Louvers:** Vision-proof, inverted V or Vision-proof, inverted Y. Hot-dip galvanized steel, 0.040 inch (1.0 mm) thick, with baked-enamel- or powder-coated finish.
2. **Louvers for Fire-Rated Doors:** Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less. Hot-dip galvanized steel, 0.040 inch (1.0 mm) thick, with baked-enamel- or powder-coated finish.

H. **Fabrication:**

1. **Factory fit doors** to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

   a. *Comply* with requirements in NFPA 80 for fire-rated doors.

2. **Factory machine doors** for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

   a. *Coordinate* with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
   b. *Metal Astragals:* Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

3. **Transom and Side Panels:** Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

   a. *Fabricate door* and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

4. **Openings:** Cut and trim openings through doors in factory.

   a. *Light Openings:* Trim openings with moldings of material and profile indicated.
   b. *Glazing:* Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in elsewhere in this Division.
   c. *Louvers:* Factory install louvers in prepared openings.
5. **Exterior Doors:** Factory treat exterior doors with water repellent after fabrication has been completed but before factory finishing. Flash top of out-swinging doors (with manufacturer's standard metal flashing).

I. **Shop Priming:** Shop prime doors for transparent with stain (if required), other required pre-treatments, and first coat of finish as specified in Division 09 Articles "Exterior Painting" and "Interior Painting." Seal all four edges, edges of cutouts, and mortises with first coat of finish.

J. **Factory Finishing:** Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises. Finish doors at factory where indicated in schedules or on Drawings as factory transparent finished.

1. **Grade:** Premium.
2. **Finish:** AWI conversion varnish or catalyzed polyurethane system.
3. **Staining:** As selected by AOC from manufacturer's full range.
4. **Effect:** Open-grain finish or filled finish as appropriate to veneer selected.
5. **Sheen:** Satin or Semi-gloss, as indicated.

2.3 STILE AND RAIL DOORS OF STOCK DESIGN AND CONSTRUCTION

A. **Exterior Doors and Sidelites:**

1. **Grade for Transparent Finish:** Premium or Select.
2. **Wood Species for Transparent Finish:** As indicated or to match existing indicated to remain.
3. **Raised-Panel Thickness:** Manufacturer's standard, but not less than that required by WDMA I.S.6 for design group indicated or as indicated.
4. **Glass for Openings:** Uncoated, clear, insulating-glass units made from 2 lites of 3.0-mm-thick, fully tempered glass with 1/4-inch (6.4-mm) interspace complying with Division 08 Section "Glazing."
5. **Exterior Door Types:** WDMA Design Group 1-3/4 Thermal (Insulated-Glass) Doors (Exterior), Panel Design as indicated.

B. **Interior Doors:**

1. **Grade for Transparent Finish:** Premium or Select.
2. **Wood Species for Transparent Finish:** As indicated or to match existing indicated to remain.

3. **Raised-Panel Thickness:** Manufacturer's standard, but not less than that required by WDMA I.S.6 for design group indicated or as indicated.
4. **Flat-Panel Thickness:** Manufacturer's standard, but not less than that required by WDMA I.S.6 for design group indicated or as indicated.
5. **Glass for Openings:** Uncoated, clear, fully tempered float glass, 5.0 mm thick or laminated glass made from 2 lites of 3.0-mm-thick annealed glass complying with Division 08 Article "Glazing."
6. **Interior Door Types:** WDMA Design Group 1-3/8 Interior Panel Doors, Panel Design as indicated or to match existing indicated to remain.

C. **Interior Fire-rated Door Frames:** Frames, complete with sidelite frames and casings, fabricated from solid fire-retardant-treated wood or from veneered fire-retardant particleboard, fire-retardant medium-density fiberboard, or mineral board. Species to match door.

D. **Stile and Rail Door Fabrication:**

1. **Fabricate stile and rail** wood doors in sizes indicated for Project-site fitting.
2. **Factory fit doors** to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

   a. *Clearances:* Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/2 inch (13 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 3/8 inch (10 mm) from bottom of door to top of threshold. Comply with NFPA 80 for fire-rated doors.
   b. *Bevel non-fire-rated doors* 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
   c. *Bevel fire-rated doors* 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.

3. **Factory machine doors** for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W Series standards, and hardware templates. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
4. **Glazed Openings:** Glaze doors at factory with glass of type and thickness indicated, complying with Division 08 Section "Glazing." Install glass using manufacturer's standard elastomeric glazing sealant complying with ASTM C 920. Secure glass in place with removable wood stops.
5. **Transom and Side Panels:** Fabricate panels to match adjoining doors in materials, finish, and quality of construction.
6. **Exterior Doors:** Factory treat exterior doors after fabrication with water-repellent preservative to comply with WDMA I.S.4. Flash top of out-swinging doors with manufacturer's standard metal flashing.

E. **Shop Priming:**

1. **Doors for Transparent Finish:** Shop apply stain (if required), other required pre-treatments, and first coat of finish specified in Division 09 Article "Painting" to faces and edges of doors, including mortises and cutouts.
2. **Doors for Exterior Wood Stain Finish:** Shop apply one coat of stain specified in Division 09 Section "Staining and Transparent Finishing" to faces and edges of doors, including mortises and cutouts.

F. **Stile and Rail Door Factory Finishing:** Comply with referenced quality standard's requirements for factory finishing. Finish faces and edges of doors, including mortises and cutouts. Finish wood doors at factory where indicated in schedules or on Drawings as factory finished.

1. **Transparent Finish:** Comply with requirements indicated for grade, finish system, staining effect, and sheen.

a. *Grade:* Premium.
b. *Exterior Door Finish:* AWI System TR-4 conversion varnish.
c. *Interior Door Finish:* WIC System #3 catalyzed polyurethane.
d. *Staining:* As selected by AOC from manufacturer's full range.
e. *Effect:* As indicated or to match existing indicated to remain.
f. *Sheen:* As indicated or to match existing indicated to remain.

2.4 ACCESS DOORS AND FRAMES

A. **Steel Materials:**

1. **Steel Plates, Shapes, and Bars:** ASTM A 36/A 36M.

a. *ASTM A 123/A 123M*, for galvanizing steel and iron products.
b. *ASTM A 153/A 153M*, for galvanizing steel and iron hardware.

2. **Steel Sheet:** Uncoated or electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
3. **Steel Finishes:** Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

a. *Surface Preparation for Steel Sheet:* Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
b. *Surface Preparation for Metallic-Coated Steel Sheet:* Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied

over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

1) *Galvanizing Repair Paint:* High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
2) *Factory-Primed Finish:* Apply shop primer immediately after cleaning and pre-treating.

4. **Drywall Beads:** Edge trim formed from 0.0299-inch (0.76-mm) zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.
5. **Plaster Beads:** Casing bead formed from 0.0299-inch (0.76-mm) zinc-coated steel sheet with flange formed out of expanded metal lath and in size to suit thickness of plaster.

B. **Access Doors and Frames for Walls and Ceilings:**

1. **Flush Access Doors and Frames with Exposed Trim/Trimless Frames:** Fabricated from steel sheet.

a. *Locations:* Wall and ceiling surfaces.
b. *Door:* Minimum 0.060-inch- (1.5-mm-) thick sheet metal, set flush with exposed face flange of frame.
c. *Exposed Trim Frame:* Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-inch- (25-mm-) wide, surface-mounted trim.
d. *Trimless Frame:* Minimum 0.060-inch- (1.5-mm-) thick sheet metal with drywall or plaster bead flange.
d. *Hinges:* Spring-loaded, concealed-pin type.
e. *Lock:* Mortise cylinder.

2. **Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim/Trimless Frames:** Fabricated from steel sheet.

a. *Locations:* Wall and ceiling surfaces.
b. *Fire-Resistance Rating:* Not less than that of adjacent construction.
c. *Temperature Rise Rating:* 250 deg F (139 deg C) at the end of 30 minutes.
d. *Door:* Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch (0.9 mm).
e. *Exposed Trim Frames:* Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-inch- (25-mm-) wide, surface-mounted trim.
f. *Trimless Frames:* Minimum 0.060-inch- (1.5-mm-) thick sheet metal with drywall or plaster bead.
g. *Hinges:* Concealed-pin type.
h. *Automatic Closer:* Spring type.
i. *Lock:* Self-latching device with mortise cylinder lock.

3. **Fire Rated, Uninsulated, Flush Access Doors and Frames with Exposed Trim:** Fabricated from steel sheet.

   a. *Locations:* Wall surfaces.
   b. *Fire-Resistance Rating:* Not less than that of adjacent construction.
   c. *Door:* Minimum 0.060-inch- (1.5-mm-) thick sheet metal, flush construction.
   d. *Frame:* Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-inch- (25-mm-) wide, surface-mounted trim.
   e. *Hinges:* Concealed-pin type.
   f. *Automatic Closer:* Spring type.
   g. *Latch:* Self-latching device operated by flush key with interior release.
   h. *Lock:* Self-latching device with mortise cylinder lock.

C. **Fabrication:** Provide access door and frame assemblies manufactured as integral units ready for installation.

1. **Metal Surfaces:** For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
2. **Doors and Frames:** Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

   a. *Exposed Flanges:* As indicated.
   b. *For trimless frames* with drywall bead, provide edge trim for gypsum board and gypsum base securely attached to perimeter of frames.
   c. *For trimless frames* with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
   d. *Provide mounting holes* in frames for attachment of units to metal or wood framing.
   e. *Provide mounting* holes in frame for attachment of masonry anchors.

3. **Recessed Access Doors:** Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. For recessed doors with plaster in-fill, provide self-furring expanded metal lath attached to door panel.
4. **Latching Mechanisms:** Furnish number required to hold doors in flush, smooth plane when closed.

   a. *For cylinder lock*, furnish two keys per lock and key all locks alike.
   b. *For recessed panel doors*, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

2.5 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS:

A. **Materials:**

1. **Aluminum:** Alloy and temper recommended by manufacturer for type of use and finish indicated.

   a. *Sheet and Plate:* ASTM B 209 (ASTM B 209M).
   b. *Extruded Bars, Rods, Profiles, and Tubes:* ASTM B 221 (ASTM B 221M).
   c. *Extruded Structural Pipe and Tubes:* ASTM B 429.
   d. *Structural Profiles:* ASTM B 308/B 308M.
   e. *Welding Rods and Bare Electrodes:* AWS A5.10/A5.10M.

2. **Steel Reinforcement:** With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

   a. *Structural Shapes, Plates, and Bars:* ASTM A 36/A 36M.
   b. *Cold-Rolled Sheet and Strip:* ASTM A 1008/A 1008M.
   c. *Hot-Rolled Sheet and Strip:* ASTM A 1011/A 1011M.

B. **Framing Systems:**

1. **Framing Members:** Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

   a. *Construction:* Interior systems - Nonthermal; exterior systems - Framing members are composite assemblies of two separate extruded-aluminum components permanently bonded by an elastomeric material of low thermal conductance.

2. **Brackets and Reinforcements:** Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.
3. **Fasteners and Accessories:** Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.

   a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
   b. Reinforce members as required to receive fastener threads.
   c. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

4. **Concrete and Masonry Inserts:** Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
5. **Flashing:** Manufacturer's standard corrosion-resistant, non-staining, non-bleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.

6. **Framing System Gaskets and Sealants:** Manufacturer's standard recommended by manufacturer for joint type.

C. **Glazing Systems:**

1. **Glazing:** As specified in Division 08 Article "Glazing."
2. **Glazing Gaskets:** Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.
3. **Spacers and Setting Blocks:** Manufacturer's standard elastomeric types.
4. **Bond-Breaker Tape:** Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
5. **Glazing Sealants:** For structural-sealant-glazed systems, as recommended by manufacturer for joint type and as follows:

    a. *Structural Sealant:* ASTM C 1184, neutral-curing silicone formulation compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant, and approved by structural-sealant manufacturer for use in aluminum-framed systems indicated. Color as selected by Architect from manufacturer's full range of colors.
    b. *Weatherseal Sealant:* ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; neutral-curing silicone formulation compatible with structural sealant and other system components with which it comes in contact; and recommended by structural- and weatherseal-sealant and aluminum-framed system manufacturers for this use. Color matching structural sealant.

D. **Doors:** Manufacturer's standard glazed doors, for manual swing operation.

1. **Door Construction:** 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.
2. **Door Design:** Medium stile; 3-1/2-inch (88.9-mm) nominal width or as indicated. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.
3. **Glazing Stops and Gaskets:** Beveled, snap-on, extruded-aluminum stops and preformed gaskets. Provide nonremovable glazing stops on outside of door.
4. **Door Hardware:** As specified in Division 08 Section "Door Hardware."

E. **Door Hardware:**

1. **General:** Provide heavy-duty units in sizes and types recommended by entrance system and hardware manufacturers for entrances and uses indicated. *References to BHMA Standards:* Provide products complying with standards referenced in this Article and with requirements for description, quality, type, and function listed in the Door Hardware Schedule at the end of Part 3

1. **Opening-Force Requirements:**

   a. Egress Doors: Not more than 30 lbf (133 N) required to set door in motion and not more than 15 lbf (67 N) required to open door to minimum required width.
   b. Accessible Interior Doors: Not more than 5 lbf (22.2 N).

2. **Pivot Hinges:** *Standard:* BHMA A156.4, Grade 1.

   a. *Offset-Pivot Hinges:* Provide top, bottom, and intermediate offset pivots at each door leaf.

3. **Locking Devices, General:** Do not require use of key, tool, or special knowledge for operation. Opening-Force Requirements:

   a. *Delayed-Egress Locks:* Lock releases within 15 seconds after applying a force of not more than 15 lbf (67 N) for not more than 3 seconds.
   b. *Latches and Exit Devices:* Not more than 15 lbf (67 N) required to release latch.

4. **Mortise Auxiliary Locks:** BHMA A156.5, Grade 1.
5. **Manual Flush Bolts:** BHMA A156.16, Grade 1.
6. **Automatic and Self-Latching Flush Bolts:** BHMA A156.3, Grade 1.
7. **Panic Exit Devices:** BHMA A156.3, Grade 1. Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
8. **Cylinders:** BHMA A156.5, Grade 1.

   a. *Keying:* Master key system. Permanently inscribe each key with a visual key control number and include notation "U.S. GOVERNMENT - DO NOT DUPLICATE".

9. **Strikes:** Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
10. **Operating Trim:** BHMA A156.6.
11. **Removable Mullions:** BHMA A156.3. When used with panic exit devices, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.
12. **Closers:** BHMA A156.4, Grade 1. With accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use, and adjustable to meet field conditions and requirements for opening force.
13. **Concealed Overhead Holders:** BHMA A156.8, Grade 1.
14. **Surface-Mounted Holders:** BHMA A156.16, Grade 1.
15. **Door Stops:** BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.

16. **Weather Stripping:** Manufacturer's standard replaceable components.

    a. *Compression Type:* Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
    b. *Sliding Type:* AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

17. **Weather Sweeps:** Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
18. **Silencers:** BHMA A156.16, Grade 1.
19. **Thresholds:** BHMA A156.21. Raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (13 mm).
20. **Finger Guards:** Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

F. **Accessory Materials:**

1. **Insulating Materials:** As specified in Division 07 Article "Thermal Insulation."
2. **Joint Sealants:** For installation at perimeter of aluminum-framed systems, as specified in Division 07 Article "Joint Sealants."
3. **Bituminous Paint:** Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

G. **Fabrication:**

1. **Form aluminum shapes** before finishing.
2. **Weld in concealed locations** to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
3. **Framing Members, General:** Fabricate components that, when assembled, have the following characteristics:

    a. *Profiles* that are sharp, straight, and free of defects or deformations.
    b. *Accurately fitted joints* with ends coped or mitered.
    c. *Means to drain water* passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
    d. *Physical and thermal isolation* of glazing from framing members.
    e. *Accommodations* for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
    f. *Provisions* for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or panels.
    g. *Fasteners, anchors, and connection devices* that are concealed from view to greatest extent possible.

4. **Mechanically Glazed Framing Members:** Fabricate for flush glazing (without projecting stops).
5. **Structural-Sealant-Glazed Framing Members:** Include accommodations for using temporary support device (dutchman) to retain glazing in place while structural sealant cures.
6. **Storefront Framing:** Fabricate components for assembly using screw-spline system.
7. **Door Frames:** Reinforce as required to support loads imposed by door operation and for installing hardware.

    a. *At exterior doors*, provide compression weather stripping at fixed stops.
    b. *At interior doors*, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

8. **Doors:** Reinforce doors as required for installing hardware.

    a. *At pairs of exterior doors*, provide sliding weather stripping retained in adjustable strip mortised into door edge.
    b. *At exterior doors*, provide weather sweeps applied to door bottoms.

9. **Hardware Installation:** Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.
10. **After fabrication,** clearly mark components to identify their locations in Project according to Shop Drawings.

H. **Aluminum Finishes:**

1. **General:** Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
2. **Finish designations** prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
3. **Class I, Color Anodic Finish:** AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611. Color to match existing materials to remain or adjacent, or as indicated.

2.6 GLAZING

A. **Glass Products**:

1. **Annealed Float Glass:** ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
2. **Heat-Treated Float Glass:** ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.

a. *Fabrication Process:* By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
b. *Provide Kind HS* (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
c. *For uncoated glass*, comply with requirements for Condition A.
d. *Provide Kind FT* (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.

3. **Wired Glass:** ASTM C 1036, Type II (patterned and wired flat glass), Class 1 (clear), Quality-Q-6; and of form and mesh pattern specified.
4. **Laminated Glass:** ASTM C 1172, and complying with other requirements specified and with the following:

a. *Interlayer:* Polyvinyl butyral of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
b. *Laminating Process:* Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

5. **Insulating-Glass Units, General:** Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.

a. *Provide Kind HS* (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
b. *Provide Kind FT* (fully tempered) glass lites where safety glass is indicated.
c. *Overall Unit Thickness and Thickness of Each Lite:* Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
d. *Sealing System:* Dual seal, with primary and secondary manufacturer's standard sealants.
e. *Spacer Specifications:* Manufacturer's standard spacer material and construction complying with the following requirements:

1) *Spacer Material:* Aluminum with mill or clear anodic finish.
2) *Desiccant:* Molecular sieve or silica gel, or blend of both.
3) *Corner Construction:* Manufacturer's standard corner construction.

B. **Glazing Gaskets:**

1. *Dense Compression Gaskets:* Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal: Neoprene, ASTM C 864; EPDM, ASTM C 864; or Silicone, ASTM C 1115.
2. *Soft Compression Gaskets:* Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal: Neoprene; EPDM; or Silicone.

C. **Glazing Sealants:**

1. **General:** Provide products of type indicated, complying with the following requirements:

   a. *Compatibility:* Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   b. *Suitability:* Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   c. *Colors of Exposed Glazing Sealants:* As selected by AOC from manufacturer's full range.

2. **Elastomeric Glazing Sealants:** Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

   a. *Single-Component Neutral- and Basic-Curing Silicone Glazing Sealants:*

      1) *Type and Grade:* S (single component) and NS (non-sag).
      2) *Class:* 50.
      3) *Use Related to Exposure:* NT (non-traffic).
      4) *Uses Related to Glazing Substrates:* M, G, A, and, as applicable to glazing substrates indicated, O.
      5) *Applications:* Exterior glazing.

   b. *Neutral-Curing Silicone Glazing Sealants:*

      1) *Type and Grade:* S (single component) and NS (non-sag).
      2) *Class:* 50.
      3) *Use Related to Exposure:* NT (non-traffic).
      4) *Uses Related to Glazing Substrates:* M, G, A, and, as applicable to glazing substrates indicated, O.
      5) *Applications:* Exterior glazing.

c. *Class 25 Neutral-Curing and Acid-Curing Silicone Glazing Sealants:*

1) *Type and Grade:* S (single component) and NS (non-sag).
2) *Class:* 25.
3) *Use Related to Exposure:* NT (non-traffic).
4) *Uses Related to Glazing Substrates:* M, G, A, and, as applicable to glazing substrates indicated, O.
5) *Applications:* Interior glazing, borrowed lights, etc.

3. **Glazing Sealants for Fire-Resistive Glazing Products:** Identical to products used in test assemblies to obtain fire-protection rating.

PART 3 - EXECUTION

3.1 STANDARD HOLLOW METAL DOORS AND FRAMES

A. **Examination:** Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. **Preparation:**

1. **Remove welded-in** shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
2. **Prior to installation**, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

3. **Drill and tap doors** and frames to receive non-templated, mortised, and surface-mounted door hardware.

C. **Installation:** Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

1. **Hollow Metal Frames:** Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

a. **Set frames accurately in position**, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

1) At fire-protection-rated openings, install frames according to NFPA 80.
2) Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
3) Install frames with removable glazing stops located on secure side of opening.
4) Install door silencers in frames before grouting.
5) Remove temporary braces necessary for installation only after frames have been properly set and secured.
6) Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
7) Field apply bituminous coating to backs of frames that are filled with grout containing anti-freezing agents.

b. **Floor Anchors:** Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

1) Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.

c. **Metal-Stud Partitions:** Solidly pack mineral-fiber insulation behind frames.
d. **Masonry Walls:** Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
e. **Concrete Walls:** Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
f. **In-Place Concrete or Masonry Construction:** Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
g. **In-Place Gypsum Board Partitions:** Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
h. **Ceiling Struts:** Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to

provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.

i. **Installation Tolerances:** Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

1) Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2) Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
3) Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4) Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

2. **Hollow Metal Doors:** Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

a. Non-Fire-Rated Standard Steel Doors:

1) Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
2) Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).

b. **Between Bottom of Door and Top of Threshold:** Maximum 3/8 inch (9.5 mm).
c. **Between Bottom of Door and Top of Finish Floor (No Threshold):** Maximum 3/4 inch (19 mm).
d. **Fire-Rated Doors:** Install doors with clearances according to NFPA 80.
e. **Smoke-Control Doors:** Install doors according to NFPA 105.

3. **Glazing:** Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.

D. **Adjusting and Cleaning**: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

1. Remove grout and other bonding material from hollow metal work immediately after installation.
2. Prime-Coat Touch-up: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touch-up of compatible air-drying, rust-inhibitive primer.

3.2 WOOD DOORS

A. **Examination:** Examine doors and substrates, with Installer present, for suitable conditions where wood doors and fire-rated wood door frames will be installed. Verify that installed

frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads. Reject doors with defects.

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

B. **Installation:**

1. **Install** fire-rated wood door frames level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment. Countersink fasteners, fill surface flush, and sand smooth.
2. **Hardware:** For installation, see Division 08 Article "Door Hardware."
3. **Install wood doors** to comply with manufacturer's written instructions and with referenced quality standard, and as indicated. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
4. **Job-Fitted Doors:** Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim door stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.

    a. *Clearances:* Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold. Comply with NFPA 80 for fire-rated doors.
    b. *Bevel non-fire-rated doors* 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
    c. *Bevel fire-rated doors* 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.

5. **Factory-Fitted Doors:** Align in frames for uniform clearance at each edge.
6. **Factory-Finished Doors:** Restore finish before installation if fitting or machining is required at Project site.
7. **Field-Finished Doors:** Refer to Division 09 Articles "Interior and Exterior Painting."

C. **Adjusting and Protecting:**

1. **Operation:** Rehang or replace doors that do not swing or operate freely.
2. **Finished Doors:** Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

3.3 ACCESS DOORS AND FRAMES

A. **Installation:** Comply with manufacturer's written instructions for installing access doors and frames. Set frames accurately in position and attach securely to supports with plane of face

panels aligned with adjacent finish surfaces. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

B. **Adjusting and Cleaning:** Adjust doors and hardware after installation for proper operation. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

3.4 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

A. **Installation:** Comply with manufacturer's written instructions. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration. Seal joints watertight, unless otherwise indicated.

1. **Metal Protection:** Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
2. **Install components** to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
3. **Set continuous sill members** and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" and to produce weather-tight installation.
4. **Install components** plumb and true in alignment with established lines and grades, without warp or rack.
5. **Install glazing** as specified in Division 08 Article "Glazing."
6. **Entrances:** Install to produce smooth operation and tight fit at contact points.

    a. Exterior Entrances: Install to produce tight fit at weather stripping and weather-tight closure.
    b. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

7. **Install insulation materials** as specified in Division 07 Article "Thermal Insulation."
8. **Install perimeter joint sealants** as specified in Division 07 Article "Joint Sealants" and to produce weather-tight installation.
9. **Erection Tolerances:** Install aluminum-framed systems to comply with the following maximum tolerances:

    a. *Location and Plane:* Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
    b. *Alignment:*

        1) Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).

2) Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).

c. *Diagonal Measurements:* Limit difference between diagonal measurement to 1/8 inch (3 mm).

B. **Field Quality Control:**

1. **Testing Agency:** AOC will engage, as required**,** a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
2. **Repair or remove work** where test results and inspections indicate that it does not comply with specified requirements.
3. **Additional testing** and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

C. **Adjusting:**

1. **Entrances:** Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches (75 mm) from the latch measured to the leading door edge.

3.5 **GLAZING:**

A. **Examination:**

1. Examine framing glazing, with Installer present, for compliance with the following:

a. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
b. Presence and functioning of weep system.
c. Minimum required face or edge clearances.
d. Effective sealing between joints of glass-framing members.

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

B. **Preparation:** Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

C. **Glazing, General:** Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

1. **Glazing channel dimensions**, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
2. **Protect glass edges** from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
3. **Apply primers** to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
4. **Install setting blocks in sill rabbets**, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
5. **Do not exceed** edge pressures stipulated by glass manufacturers for installing glass lites.
6. **Provide spacers** for glass lites where length plus width is larger than 50 inches (1270 mm) as follows:

    a. *Locate spacers directly opposite each other* on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
    b. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

7. **Provide edge blocking** where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
8. **Set glass lites** in each series with uniform pattern, draw, bow, and similar characteristics.
9. **Where wedge-shaped gaskets** are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
10. **Square cut wedge-shaped gaskets** at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

D. **Sealant Glazing (Wet):** Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

1. **Force sealants** into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
2. **Tool exposed surfaces** of sealants to provide a substantial wash away from glass.

E. **Cleaning and Protection:** Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

1. **Protect glass** from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.
2. **Examine glass surfaces adjacent** to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
3. **Remove and replace glass** that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
4. **Wash glass** on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF DIVISION EIGHT

DIVISION NINE - FINISHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Division** includes the following:

1. Nonstructural steel framing and furring (Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.); interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.)).
2. Gypsum plasterwork on expanded-metal lath and solid-plaster bases.
3. Interior gypsum board.
4. Exterior gypsum board for ceilings and soffits.
5. Cementitious backer units installed as part of tile and stone installations.
6. Ceramic mosaic tile.
7. Quarry tile.
8. Paver tile.
9. Glazed wall tile.
10. Stone thresholds installed as part of tile installations.
11. Waterproof membrane for thin-set tile installations.
12. Crack-suppression membrane for thin-set tile installations.
13. Metal edge strips installed as part of tile and dimension stone tile installations.
14. Dimension stone tile and related setting materials applied to floors.
15. Acoustical panels and exposed suspension systems for ceilings.
16. Acoustical tiles for ceilings and the following: Concealed suspension systems; direct attachment of tiles to substrates with adhesive; and direct attachment of tiles to substrates with staples.
17. Resilient Flooring: Solid vinyl floor tile; vinyl composition floor tile; and resilient terrazzo floor tile.
18. Access flooring panels and understructure, and floor panel coverings.
19. Interior and exterior painting.

1.3 DEFINITIONS

A. **Tile Module Size:** Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

B. **Tile Facial Dimension:** Nominal tile size as defined in ANSI A137.1.

C. **Dimension Stone Tile:** Modular stone units less than 3/4 inch (20 mm) thick.

D. **Dimension Stone Module Size:** Actual tile size plus joint width.

E. **Dimension Stone Polished Finish:** Smooth finish that produces sharp, mirrorlike reflections. Reflected images of overhead fluorescent tubes have straight lines without visible distortion when viewed at arm's length.

F. **Dimension Stone Honed Finish:** Smooth, nonreflective finish similar to that produced by grinding with a 400- to 1200-grit abrasive; with a gap not exceeding 0.005 inch (0.13 mm), when faces are tested for flatness with a 24-inch (600-mm) straightedge.

G. **Dimension Stone Sand-Rubbed Finish:** Uniform, fine-textured surface similar to that produced by grinding with a 40-grit abrasive; with a gap not exceeding 1/32 inch (0.8 mm), when faces are tested for flatness with a 24-inch (600-mm) straightedge.

H. **Dimension Stone Thermal Finish:** Uniform, coarse-textured surface produced by thermal shock; with a gap not exceeding 3/16 inch (5 mm), when faces are tested for flatness with a 24-inch (600-mm) straightedge.

I. **Dimension Stone Natural-Cleft Finish:** Uneven surface produced by splitting stone along a natural cleavage plane; without visible tool marks and with a gap not exceeding 3/16 inch (5 mm), when faces are tested for flatness with a 24-inch (600-mm) straightedge.

J. **AC:** Articulation Class.

K. **CAC:** Ceiling Attenuation Class.

L. **LR:** Light Reflectance coefficient.

M. **NRC:** Noise Reduction Coefficient.

N. **ESD:** Electrostatic discharge. The transfer of electric charge between bodies at different potentials.

O. **Access Flooring System:** Assemblies composed of modular floor panels on pedestals with or without stringers.

1.4 PERFORMANCE REQUIREMENTS

A. **Static Coefficient of Friction:** For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.5 SUBMITTALS

A. **Product Data:** For each type of product indicated.

1. **Paints:**

a. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
b. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

B. **Shop Drawings:** Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.

1. **Wood Flooring:** Show installation details including location and layout of each type of wood flooring and accessory.
2. **Access Flooring:** Include layout of access flooring system and relationship to adjoining Work based on field-verified dimensions.

a. Details and sections with descriptive notes indicating materials, finishes, fasteners, typical and special edge conditions, accessories, and understructure.
b. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. **Samples for Initial Selection:**

1. **Flooring:** For each type of flooring material, grout, and exposed finish indicated. For wood floor submit manufacturer's color charts showing the full range of colors and finishes available for wood flooring.
2. **Paints:** For each type of topcoat product indicated.

D. **Samples for Verification:** For each type of flooring material, grout, and exposed finish indicated.

1. **Tile:** Full-size units of each type and composition of tile and for each color and finish required. Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches (300 mm) square and mounted on rigid panel. Use grout of type and in color or colors approved for completed work.

a. Full-size units of each type of trim and accessory for each color and finish required.
b. Stone thresholds in 6-inch (150-mm) lengths.
c. Metal edge strips in 6-inch (150-mm) lengths.

2. **Wood Flooring:** For each type of wood flooring and accessory, with stain color and finish required, approximately 12 inches (300 mm) long and of same thickness and material indicated for the Work and showing the full range of normal color and texture variations expected.
3. **Resilient Flooring:** Full-size units of each type and composition of tile and for each color and finish required.
4. **Acoustical Ceilings:** For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

    a. Acoustical Panel: Set of 6-inch- (150-mm-) square samples of each type, color, pattern, and texture.
    b. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- (300-mm-) long Samples of each type, finish, and color.

5. **Access Flooring:**

    a. Plastic Laminate: Size equal to full-size floor panel.
    b. Resilient Accessories: Manufacturer's standard accessories but not less than 12 inches (300 mm) in length.
    c. Exposed Metal Accessories: 12 inches (300 mm) in length.
    d. One complete full-size floor panel, pedestal, and understructure unit for each type of access flooring system required.

6. **Paint:** For each type of paint system and in each color and gloss of topcoat indicated.

    a. Submit Samples on rigid backing, 8 inches (200 mm) square.
    b. Step coats on Samples to show each coat required for system.
    c. Label each coat of each Sample.
    d. Label each Sample for location and application area.

E. **Ceiling Coordination Drawings:** Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling suspension system members.
2. Method of attaching hangers to building structure. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
4. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

F. **Tile Product Certificates:** For each type of product, signed by product manufacturer.

G. **Mockups:** Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for each level of gypsum board finish indicated for use in exposed locations and for each texture finish indicated.
2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 QUALITY ASSURANCE

A. **Preinstallation Conference:** Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

B. **Fire-Test-Response Characteristics:** For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

C. **STC-Rated Assemblies:** For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

D. **Tile Source Limitations for Tile:** Obtain all tile of same type and color or finish from one source or producer. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

E. **Source Limitations for Tile-Setting and Grouting Materials:** Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

F. **Source Limitations for Stone Tile and Thresholds:** Obtain each type of stone product through one source from a single producer. Obtain each variety of stone, regardless of product, size, and finish, from same location in a single quarry with resources to provide materials of consistent quality in appearance and physical properties.

G. **Acoustical Testing Agency Qualifications:** An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.

H. **Acoustical Ceiling Source Limitations:** Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.

I. **Acoustical Ceiling Fire-Test-Response Characteristics:** Provide acoustical panel ceilings that comply with the following requirements:

1. **Fire-Resistance Characteristics:** Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
2. **Surface-Burning Characteristics:** Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A or B, as indicated materials as determined by testing identical products per ASTM E 84:

   a. *Smoke-Developed Index:* 450 or less.

J. **Wood Flooring Source Limitations:** For field-finished wood flooring, obtain each species, grade, and cut of wood from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

K. **Wood Flooring Forest Certification:** Provide wood flooring produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."

1. **Hardwood Flooring:** Comply with NOFMA's "Official Flooring Grading Rules" for species, grade, and cut. Certification: Provide flooring that carries NOFMA grade stamp on each bundle or piece.
2. **Maple Flooring:** Comply with applicable MFMA grading rules for species, grade, and cut. Certification: Provide flooring that carries MFMA mark on each bundle or piece.

L. **Resilient Flooring Fire-Test-Response Characteristics:** As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

M. **Access Flooring Structural Performance:** Provide access flooring systems capable of withstanding the following loads and stresses within limits and under conditions indicated, as determined by testing manufacturer's current standard products according to referenced procedures in CISCA A/F, "Recommended Test Procedures for Access Floors." Fabricate and install access flooring to comply with NFPA 75 requirements for raised flooring:

1. **Concentrated Loads:** Provide floor panels, including those with cutouts, capable of withstanding a concentrated design load of 1000 lbf (4448 N) (or as indicated for the specific installation), with a top-surface deflection under load and a permanent set not to exceed, respectively, 0.10 and 0.010 inch (2.54 and 0.25 mm)according to CISCA A/F, Section I, "Concentrated Loads."
2. **Ultimate Loads:** Provide access flooring systems capable of withstanding a minimum ultimate concentrated load of 2000 lbf (8896 N) (or as indicated for the specific installation), without failing, according to CISCA A/F, Section II, "Ultimate Loading."

3. **Rolling Loads (Computer Rooms and Cart Travel Paths):** Provide access flooring systems capable of withstanding rolling loads of the following magnitude, with a combination of local and overall deformation not to exceed 0.040 inch (1.02 mm) after exposure to rolling load over CISCA A/F Path A or B, whichever path produces the greatest top-surface deformation, according to CISCA A/F, Section III, "Rolling Loads."

   a. *CISCA A/F Wheel 1 Rolling Load:* 1000 lbf (4448 N).

4. **Stringer Load Testing:** Provide stringers, without panels in place, capable of withstanding a concentrated load of 75 lbf (334 N) (or as indicated for the specific installation), at center of span with a permanent set not to exceed 0.010 inch (0.25 mm), as determined per CISCA A/F, Section IV, "Stringer Load Testing."
5. **Pedestal Axial Load Test:** Provide pedestal assemblies, without panels or other supports in place, capable of withstanding a 5000 lbf (22 240 N) axial load per pedestal, according to CISCA A/F, Section V, "Pedestal Axial Load Test."
6. **Pedestal Overturning Moment Test:** Provide pedestal assemblies, without panels or other supports in place, capable of withstanding an overturning moment per pedestal of 1000 lbf x inches (113 N x meters), according to CISCA A/F, Section VI, "Pedestal Overturning Moment Test."

N. **Access Flooring Floor Panel Impact-Load Performance:** Provide access flooring system capable of withstanding an impact load of 75 lb (34.0 kg)] (or as indicated for the specific installation), when dropped from 36 inches (914 mm) onto a 1-sq. in. (6.5-sq. cm) area located anywhere on panel, without failing. Failure is defined as collapse of access flooring system. Provide floor panels that are clearly and permanently marked on their underside with panel type and concentrated-load rating.

O. **Paint Standards:**

1. **Products:** Complying with Master Painters Institute (MPI) standards indicated and listed in "MPI Approved Products List."
2. **Preparation and Workmanship:** Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.7 STORAGE AND HANDLING

A. **Store materials** inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

B. **Store floor tile** and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

C. **Deliver acoustical panels**, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they

will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

D. **Deliver wood flooring materials** in unopened cartons or bundles. Protect wood flooring from exposure to moisture. Do not deliver wood flooring until after concrete, masonry, plaster, ceramic tile, and similar wet work is complete and dry. Store wood flooring materials in a dry, warm, ventilated, weather-tight location.

1.8 PROJECT CONDITIONS

A. **Tile Environmental Limitations:** Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

B. **Wood Flooring Environmental Limitations:** Conditioning period begins not less than seven days before wood flooring installation, is continuous through installation, and continues not less than seven days after wood flooring installation.

1. **Environmental Conditioning:** Maintain an ambient temperature between 65 and 75 deg F (18 and 24 deg C) and relative humidity planned for building occupants in spaces to receive wood flooring during the conditioning period.
2. **Wood Flooring Conditioning:** Move wood flooring into spaces where it will be installed, no later than the beginning of the conditioning period.

   a. Do not install flooring until it adjusts to relative humidity of, and is at same temperature as, space where it is to be installed.
   b. Open sealed packages to allow wood flooring to acclimatize immediately on moving flooring into spaces in which it will be installed.
   c. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.

C. **Painting Conditions:** Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C). Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.9 SEQUENCING AND SCHEDULING

A. **Sequence stone tile installation** with other work to minimize possibility of damage and soiling during remainder of construction period.

B. **Install stone tile and accessories** only after other finishing operations, including painting, have been completed.

C.. **Install factory-finished wood flooring** after other finishing operations, including painting, have been completed.

1.10 **COORDINATION**

A. **Coordinate layout and installation** of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 **NON-LOAD-BEARING STEEL FRAMING, GENERAL**

A. **Framing Members, General:** Comply with ASTM C 754 for conditions indicated.

1. **Steel Sheet Components:** Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
2. **Protective Coating:** ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized, unless otherwise indicated.

2.2 **STEEL SUSPENSION SYSTEM COMPONENTS**

A. **Tie Wire:** ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.

B. **Hanger Attachments to Concrete:** Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.

1. **Powder-Actuated Fasteners:** Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. **Wire Hangers:** ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch (4.12-mm) diameter.

D. **Carrying Channels:** Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.37 mm) and minimum 1/2-inch- (12.7-mm-) wide flanges. Depth: As indicated on Drawings.

E. **Furring Channels (Furring Members):**

1. **Cold-Rolled Channels:** 0.0538-inch (1.37-mm) bare-steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flanges, 3/4 inch (19.1 mm) deep.
2. **Steel Studs:** ASTM C 645. Minimum Base-Metal Thickness: 0.0179 inch (0.45 mm) and depth as indicated on Drawings.
3. **Hat-Shaped, Rigid Furring Channels:** ASTM C 645, 7/8 inch (22.2 mm) deep. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
4. **Resilient Furring Channels:** 1/2-inch- (12.7-mm-) deep members designed to reduce sound transmission.

F. **Grid Suspension System for Ceilings:** ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

G. **Auxiliary Materials:** Provide auxiliary materials that comply with referenced installation standards.

1. **Fasteners for Metal Framing:** Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
2. **Isolation Strip at Exterior Walls:** Provide adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

A. **Steel Studs and Runners:** ASTM C 645.

1. **Minimum Base-Metal Thickness:** 0.0179 inch (0.45 mm) or as indicated on the drawings.
2. **Depth:** 3-5/8 inches (92.1 mm) or as indicated on the drawings.

B. **Slip-Type Head Joints:** Where indicated, provide one of the following:

1. **Single Long-Leg Runner System:** ASTM C 645 top runner with 2-inch- (50.8-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
2. **Double-Runner System:** ASTM C 645 top runners, inside runner with 2-inch- (50.8-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
3. **Deflection Track:** Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

C. **Firestop Tracks:** Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. **Flat Strap and Backing Plate:** Steel sheet for blocking and bracing in length and width indicated. Minimum Base-Metal Thickness: 0.0179 inch (0.45 mm) or as indicated on the drawings.

E. **Cold-Rolled Channel Bridging:** 0.0538-inch (1.37-mm) bare-steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flanges.

1. **Depth:** As indicated on Drawings.
2. **Clip Angle:** Not less than 1-1/2 by 1-1/2 inches (38.1 by 38.1 mm), 0.068-inch- (1.73-mm-) thick, galvanized steel.

F. **Hat-Shaped, Rigid Furring Channels:** ASTM C 645, 7/8 inch (22.2 mm) deep. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).

G. **Resilient Furring Channels:** 1/2-inch- (12.7-mm-) deep, steel sheet members designed to reduce sound transmission.

H. **Cold-Rolled Furring Channels:** 0.0538-inch (1.37-mm) bare-steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flanges.

1. **Depth:** 3/4 inch (19.1 mm).
2. **Furring Brackets:** Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness of 0.0312 inch (0.79 mm).
3. **Tie Wire:** ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.

I. **Z-Shaped Furring:** With slotted or nonslotted web, face flange of 1-1/4 inches (31.8 mm), wall attachment flange of 7/8 inch (22.2 mm), minimum bare-metal thickness of 0.0179 inch (0.45 mm), and depth required to fit insulation thickness indicated

2.4 GYPSUM BOARD

A. **Panels, General:** Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

B. **Interior Gypsum Board**: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

1. **Regular Type:** 1/2 inch (12.7 mm) thick, with long edges tapered.
2. **Type X:** 5/8 inch (15.9 mm) thick, with long edges tapered.
3. **Flexible Type:** Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness, 1/4 inch (6.4 mm) thick, with long edges tapered.
4. **Ceiling Type:** Manufactured to have more sag resistance than regular-type gypsum board, 1/2 inch (12.7 mm) thick, with long edges tapered.

5. **Moisture- and Mold-Resistant Type:** With moisture- and mold-resistant core and surfaces, 5/8 inch (15.9 mm) thick, Type X with long edges tapered.

C. **Exterior Gypsum Board for Ceilings and Soffits:** ASTM C 931/C 931M or ASTM C 1396/C 1396M, with manufacturer's standard edges. Core: 5/8 inch (15.9 mm), Type X.

D. **Tile Backing Panels:** Cementitious Backer Units, ANSI A118.9, thickness: 1/2 inch (12.7 mm).

E. **Trim Accessories:**

1. **Interior Trim:** ASTM C 1047, galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.

   a. *Shapes:* 1) Cornerbead; 2) Bullnose bead; 3) LC-Bead: J-shaped; exposed long flange receives joint compound; 4) L-Bead: L-shaped; exposed long flange receives joint compound; 5) U-Bead: J-shaped; exposed short flange does not receive joint compound; 6) Expansion (control) joint; and 7) Curved-Edge Cornerbead: With notched or flexible flanges.

2. **Exterior Trim:** ASTM C 1047, hot-dip galvanized steel sheet, plastic, or rolled zinc.

   a. *Shapes:* 1) Cornerbead; 2) LC-Bead: J-shaped; exposed long flange receives joint compound; and 3) Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

3. **Aluminum Trim:** Extruded accessories of profiles and dimensions indicated.

   a. *Aluminum:* Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
   b. *Finish:* Corrosion-resistant primer compatible with joint compound and finish materials specified.

F. **Joint Treatment Materials:** Comply with ASTM C 475/C 475M.

1. **Joint Tape:** 1) Interior Gypsum Wallboard: Paper; 2) Exterior Gypsum Soffit Board: Paper; and 3) Tile Backing Panels: As recommended by panel manufacturer.
2. **Joint Compound for Interior Gypsum Wallboard:** For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

   a. *Prefilling:* At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   b. *Embedding and First Coat:* For embedding tape and first coat on joints, fasteners, and trim flanges, use either setting-type taping or drying-type, all-

purpose compound. Use setting-type compound for installing paper-faced metal trim accessories.

c. *Fill Coat:* For second coat, use either setting-type, sandable topping or drying-type, all-purpose compound.

d. *Finish Coat:* For third coat, use drying-type, all-purpose compound.

e. *Skim Coat:* For final coat of Level 5 finish, use drying-type, all-purpose compound.

3. **Joint Compound for Exterior Applications:** For Exterior Gypsum Soffit Board use setting-type taping compound and setting-type, sandable topping compound.
4. **Joint Compound for Tile Backing Panels:** For Cementitious Backer Units as recommended by backer unit manufacturer.

G. **Auxiliary Materials:** Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

1. **Laminating Adhesive:** Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. **Steel Drill Screws:** ASTM C 1002, unless otherwise indicated. For fastening cementitious backer units, use galvanized screws of type and size recommended by panel manufacturer.
3. **Sound Attenuation Blankets:** ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
4. **Fire-Resistance-Rated Assemblies:** Comply with mineral-fiber requirements of assembly.
5. **Acoustical Sealant:** As specified in Division 07 Section "Joint Sealants."
6. **Thermal Insulation:** As specified in Division 07 Section "Thermal Insulation."

2.5 TILE

A. **Products, General:**

1. **ANSI Ceramic Tile Standard:** Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated. Provide tile complying with Standard grade requirements, unless otherwise indicated. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
2. **ANSI Standards for Tile Installation Materials:** Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.
3. **Colors, Textures, and Patterns:** Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials as selected by AOC from manufacturer's full range.

4. **Factory Blending:** For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
5. **Mounting:** For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
6. **Factory-Applied Temporary Protective Coating:** Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

B. **Tile Products:**

1. **Unglazed Quarry Tile:** Square-edged flat tile as follows:

   a. *Wearing Surface:* Nonabrasive, smooth.
   b. *Facial Dimensions:* 6 by 6 inches (152 by 152 mm) or 7-5/8 by 7-5/8 inches (194 by 194 mm), as indicated..
   c. *Thickness:* 1/2 inch (12.7 mm).
   d. *Face:* Plain.

2. **Glazed Paver Tile:** Flat tile as follows:

   a. *Composition:* Semivitreous, vitreous, or impervious natural clay or porcelain.
   b. *Facial Dimensions:* 7-7/8 by 7-7/8 inches (200 by 200 mm) or 11-13/16 by 11-13/16 inches (300 by 300 mm), as indicated..
   c. *Thickness:* 3/8 inch (9.5 mm).
   d. *Face:* Pattern of design indicated, with square or cushion edges.
   e. *Finish:* Mat, opaque or Mat, clear, as indicated glaze.

3. **Glazed Wall Tile:** Flat tile as follows:

   a. *Module Size:* 4-1/4 by 4-1/4 inches (108 by 108 mm).
   b. *Thickness:* 5/16 inch (8 mm).
   c. *Face:* Plain with modified square edges or cushion edges.
   d. *Finish:* Bright, opaque glaze, or as indicated.
   e. *Mounting:* Factory back-mounted.
   f. *Mounting:* Pre-grouted sheets of tiles factory assembled and grouted with manufacturer's standard silicone rubber.

4. **Glazed Wall Tile Trim Units:** Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:

   a. *Base for Thin-Set Mortar Installations:* Straight, module size 4-1/4 by 4-1/4 inches (108 by 108 mm).

b. *Wainscot Cap for Thin-Set Mortar Installations:* Surface bullnose, module size 4-1/4 by 4-1/4 inches (108 by 108 mm)by 152 mm).
c. *Wainscot Cap for Flush Conditions:* Regular flat tile for conditions where tile wainscot is shown flush with wall surface above.
d. *External Corners for Thin-Set Mortar Installations:* Surface bullnose.
e. *Internal Corners:* Field-butted square corners except with coved base and cap angle pieces designed to fit with stretcher shapes.

5. **Quarry Tile Trim Units:** Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:

a. *Base:* Coved with surface bullnose top edge, facial dimensions 6 by 6 inches (152 by 152 mm).
b. *Wainscot Cap:* Surface bullnose, facial dimensions 6 by 6 inches (152 by 152 mm).
. *Wainscot Cap for Flush Conditions:* Regular flat tile for conditions where tile wainscot is shown flush with wall surface above.

6. **Accessories for Glazed Wall Tile:** Provide vitreous china accessories of type and size indicated, in color and finish to match adjoining wall tile, and intended for installing by same method as adjoining wall tile.

a. *One soap holder* with grab handle for each shower and tub indicated.
b. *One paper holder* at each water closet.

C. **Thresholds:**

1. **General:** Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.
2. **Granite Thresholds:** ASTM C 615, with honed finish. Match AOC sample.
3. **Marble Thresholds:** ASTM C 503 with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish. Match Architect's sample.

D. **Waterproofing for Thin-set Tile Installations:** Manufacturer's standard product that complies with ANSI A118.10, selected from the following.

1. **Chlorinated-Polyethylene-Sheet Product:** Non-plasticized, chlorinated polyethylene faced on both sides with high-strength, non-woven polyester fabric, for adhering to latex-portland cement mortar; 60 inches (1524 mm) wide by 0.030-inch (0.76-mm) nominal thickness.
2. **PVC-Sheet Product:** Two layers of PVC sheet heat-fused together and to facings of bondable nonwoven polyester, for adhering to latex-portland cement mortar; 60 inches (1524 mm) wide by 0.040-inch (1.01-mm) nominal thickness.

3. **Fabric-Reinforced, Modified-Bituminous-Sheet Product:** Self-adhering SBS-modified-bituminous sheet with woven reinforcement facing for adhering to latex-portland cement mortar; 36 inches (914 mm) wide by 0.040-inch (1.01-mm) nominal thickness.

E. **Setting and Grouting Materials:**

1. **Latex-Portland Cement Mortar (Thin Set):** ANSI A118.4, consisting of the following:
   a. *Prepackaged dry-mortar mix* combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive. For wall applications, provide non-sagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

2. **Organic Adhesive:** ANSI A136.1, Type I, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. **Sand-Portland Cement Grout (for Quarry Tile Installations):** ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.
4. **Polymer-Modified Tile Grout:** ANSI A118.7, color as indicated.

   a. *Polymer Type:* Either ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients, or acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.

      1) Unsanded grout mixture for joints 1/8 inch (3.2 mm) and narrower.
      2) Sanded grout mixture for joints 1/8 inch (3.2 mm) and wider.

5. **Grout for Pregrouted Tile Sheets:** Same silicone rubber used in factory to pre-grout tile sheets.

F. **Elastomeric Sealants:**

1. **General:** Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 07 Section "Joint Sealants." Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. **Colors:** Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.
3. **One-Part, Mildew-Resistant Silicone Sealant:** ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

F. **Cementitious Backer Units:** Provide cementitious backer units complying with ANSI A118.9 in maximum lengths available to minimize end-to-end butt joints.

1. **Thickness:** 1/2 inch (12.7 mm).
2. **Width:** Manufacturer's standard width, but not less than 32 inches (813 mm).

G. **Miscellaneous Materials:**

1. **Trowelable Underlayments and Patching Compounds:** Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
2. **Metal Edge Strips:** Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.
3. **Temporary Protective Coating:** Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

   a. *Petroleum paraffin wax*, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F (49 to 60 deg C) per ASTM D 87.
   b. *Grout release* in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

4. **Tile Cleaner:** A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
5. **Grout Sealer:** Manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

G. **Mixing Mortars and Grout:** Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions. Add materials, water, and additives in accurate proportions. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

2.5 STONE TILING

A. **Stone Products:**

1. **Varieties and Sources:** Subject to compliance with requirements, provide stone varieties from sources indicated. Provide stone products that are free of defects impairing their function for use indicated, including cracks, seams, and starts.
2. **Abrasion Resistance:** Provide stone with a value of not less than 10, as determined per ASTM C 1353 or ASTM C 241.

3. **Pattern Orientation:** For stone varieties with a directional pattern, provide tile with pattern indicated. For stone varieties that exhibit a directional pattern, provide thresholds with pattern oriented parallel to long edges of thresholds.

B. **Stone Tile Types:**

1. **Stone Type:** Granite, complying with ASTM C 615.
2. **Stone Type:** Limestone, complying with ASTM C 568, Classification III (High Density).
3. **Stone Type:** Marble, complying with ASTM C 503, Classification I, Calcite or II, Dolomite.
4. **Stone Type:** Travertine, complying with ASTM C 1527, Classification II, Interior.
5. **Varieties and Sources:** Project specific variety, cut, finish, edge treatment, thickness, module size, joint width, and producer will be indicated on the drawings.

C. **Stone Threshold Types:**

1. **Stone Type:** Granite, complying with ASTM C 615.
2. **Stone Type:** Marble, complying with ASTM C 503, Classification I, Calcite or II, Dolomite, as indicated.
3. **Varieties and Sources:** Project specific variety, cut, finish, edge treatment, thickness, module size, joint width, and producer will be indicated on the drawings.

D. **Setting and Grouting Materials:** (Note: Thickset and Medium-bed setting applications require project specifications prepared for approval by the AOC).

1. **Latex Additive:** Manufacturer's standard acrylic-resin or styrene-butadiene-rubber water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
2. **Latex-Portland Cement Mortar (Thin Set):** ANSI A118.4, consisting of prepackaged dry-mortar mix combined with acrylic-resin or styrene-butadiene-rubber liquid-latex additive. For wall applications, provide non-sagging mortar that complies with Paragraph F-4.6.1 in addition to other requirements in ANSI A118.4.
3. **Water-Cleanable Epoxy Adhesive:** ANSI A118.3, water-cleanable, tile-setting epoxy adhesive, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. **Organic Adhesive:** ANSI A136.1, Type I, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
5. **Sand-Portland Cement Grout:** ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce required color.
6. **Polymer-Modified Tile Grout:** ANSI A118.7, acrylic resin or styrene-butadiene rubber polymer type in liquid-latex form for addition to prepackaged dry-grout mix.
7. **Water-Cleanable Epoxy Grout:** ANSI A118.3, chemical-resistant, water-cleanable, tile-setting and -grouting epoxy, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. **Elastomeric Sealants**: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated below that comply with applicable requirements in Division 07 Section "Joint Sealants."

1. **Single-component**, mildew-resistant, acid-curing silicone sealant.
2. **Use sealants** that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. **Colors:** Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

2.7 ACOUSTICAL CEILINGS:

A. **Acoustical Panels, General:**

1. **Acoustical Panel Standard:** Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
2. **Acoustical Panel Colors and Patterns:** Match appearance characteristics indicated for each product type. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

B. **Acoustical Panels for Acoustical Panel Ceiling:** Provide, as indicated, either 24" x 24" x 5/8" or 24" x 48" x 5/8" module standard. Unless otherwise approved, provide standard square edge complying with ASTM E-1264. All tiles should be rated Class A (Flame spreads of 25 or less) under ASTM E-84. All acoustical panels shall be free of asbestos.

1. **Standard Office Ceilings (Support Buildings):** Type III, Form 2, water felted, "fissured pattern" and “perforated small holes” face (Pattern C, D) tiles. Provide NRC rating of at least 0.60, CAC of 35, and light reflectances of 0.80 or better.
2. **Kitchen and Servery Areas:** If suspended acoustical ceilings are used, provide Type IV, Form 2, wet-formed mineral fiber panels with polyester film surfaces and washable finishes. Provide NRC rating of 0.55, CAC of 35, and light reflectance of 0.80.
3. **High-Traffic or Abuse areas:** If suspended acoustical ceilings are used, provide Type XX, Form 2, pattern C D surfaces Plain face, ceramic and mineral fiber composition with high-density ceramic-like finish and scrubbable finish. Provide NRC rating of 0.55, CAC of 40, and light reflectance of 0.80.

C. **Metal Suspension Systems, General**: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

1. **Finishes and Colors, General:** Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

   a. *High-Humidity Finish:* Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

2. **Attachment Devices:** Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

a. *Anchors in Concrete:* Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

1) *Type:* Post-installed expansion or post-installed bonded anchors.
2) *Corrosion Protection:* Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.

3. **Wire Hangers, Braces, and Ties:** Provide Zinc-Coated, Carbon-Steel Wire, ASTM A 641/A 641M, Class 1 zinc coating, soft temper. Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.
4. **Hold-Down Clips:** Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.
5. **Impact Clips:** Where indicated, provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
6. **Clean-Room Gasket System (Computer Machine Rooms):** Where indicated, provide manufacturer's standard system, including manufacturer's standard gasket and related adhesives, tapes, seals, and retention clips, designed to seal out foreign material from and maintain positive pressure in clean room.

D. **Standard Metal Suspension System for Acoustical Panel Ceiling**

1. **Wide-Face, Capped, Double-Web, (Fire-Rated where indicated), Hot-Dip Galvanized, G60 (Z180), Steel Suspension System:** Main and cross runners roll formed from cold-rolled steel sheet, hot-dip galvanized according to ASTM A 653/A 653M, G60 (Z180) coating designation, with prefinished, cold-rolled, 15/16-inch- (24-mm-) wide, aluminum caps on flanges.

a. *Structural Classification:* Intermediate-duty system.
b. *Face Design:* Flat, flush.
c. *Face Finish:* Painted white.

2. **Roll-Formed, Sheet-Metal Edge Moldings and Trim:** Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

3. **Acoustical Sealant for Exposed and Concealed Joints:** Manufacturer's standard non-sag, paintable, non-staining latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.8 ACOUSTICAL TILES, GENERAL

A. **Acoustical Tile Standard:** Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

B. **Acoustical Tile Colors and Patterns:** Match appearance characteristics indicated for each product type.

1. *Where appearance characteristics* of acoustical tiles are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by AOC from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

C. **Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment:** Provide acoustical tiles treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

D. **Acoustical Tiles for Acoustical Tile Ceiling:**

1. **Classification:** Provide tiles complying with ASTM E 1264 for type, form, and pattern as follows:

   a. *Type III,* mineral base with painted finish; Form 2, water felted.
   b. *Pattern:* CD (perforated, small holes and fissured) or D (fissured), as indicated.

2. **Color:** White.
3. **LR:** Not less than 0.85.
4. **NRC:** Not less than 0.50.
5. **Edge/Joint Detail:** Square, kerfed and rabbeted, or tongue and grooved, or butt, as applicable to installation
6. **Thickness:** 5/8 inch (15 mm), or as indicated.
7 **Modular Size:** 12 by 12 inches (305 by 305 mm).

2.9 RESILIENT TILE FLOORING

A. Vinyl Composition Floor Tile:

1. **Tile Standard:** ASTM F 1066, Class 1, solid-color tile or Class 2, through-pattern tile, as indicated.
2. **Wearing Surface:** Smooth.
3. **Thickness:** 0.125 inch (3.2 mm).
4. **Size:** 12 by 12 inches (305 by 305 mm).
5. **Colors and Patterns:** As selected by AOC from full range of industry colors.

B. Installation Materials:

1. **Trowelable Leveling and Patching Compounds:** Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
2. **Adhesives:** Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
3. **Use adhesives** that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

    a. *Vinyl Composition Floor Tile Adhesives:* Not more than 50 g/L.

4. **Floor Polish:** Provide protective liquid floor polish products as recommended by manufacturer.

2.10 ACCESS FLOORING

A. Floor Panels and Understructure:

1. **Floor Panels, General:** Provide modular panels complying with the following requirements that one person, using a portable lifting device, can interchange with other field panels without disturbing adjacent panels or understructure:

    a. *Nominal Panel Size:* 24 by 24 inches (610 by 610 mm).
    b. *Fabrication Tolerances:* Fabricate panels to the following tolerances with squareness tolerances expressed as the difference between diagonal measurements from corner to corner:

        1) *Size and Squareness:* Plus or minus 0.015 inch (0.38 mm) of required size, with a squareness tolerance of plus or minus 0.015 inch (0.38 mm), unless tolerances are otherwise indicated for a specific panel type.
        2) *Flatness:* Plus or minus 0.020 inch (0.50 mm), measured on a diagonal on top of panel.

c. *Panel Attachment to Understructure:* By bolting to pedestal head. Provide panels with holes drilled in corners to align precisely with threaded holes in pedestal heads and to accept countersunk screws with heads flush with top of panel. Provide fasteners held captive to panels.

2. **Concrete-Filled, Steel Pan Panels:** Fabricated with bottom pan die-formed from electrolytic-zinc-coated steel sheet and filled with lightweight concrete that is reinforced and bonded to pan by shear ties.
3. **Pedestals:** Assembly consisting of base, column with provisions for height adjustment, and head (cap); made of steel.

   a. *Base:* Square or circular base with not less than 16 sq. in. (103 sq. cm) of bearing area.
   b. *Column:* Of height required to bring finished floor to elevations indicated. Weld to base plate.
   c. *Provide vibration-proof* leveling mechanism for making and holding fine adjustments in height over a range of not less than 2 inches (51 mm) and for locking at a selected height, so deliberate action is required to change height setting and vibratory displacement is prevented.
   d. *Head:* Designed to support understructure system indicated. Provide sound-deadening pads or gaskets at contact points between heads and panels. Provide head with four holes aligned with holes in floor panels for bolting of panels to pedestals.

4. **Stringer Systems (Areas subject to Cart Traffic):** Modular steel stringer systems made to interlock with pedestal heads and form a grid pattern placing stringers under each edge of each floor panel and a pedestal under each corner of each floor panel. Protect steel components with manufacturer's standard galvanized or corrosion-resistant paint finish.

   a. *Bolted Stringers:* System of main and cross stringers connected to pedestals with threaded fasteners accessible from above. Provide stringers that support each edge of each panel where required to meet design-load criteria.
   b. *Provide continuous gasket* at contact surfaces between panel and stringers to deaden sound, to seal off underfloor cavity from above, and to maintain panel alignment and position.

B. **Floor Panel Coverings:**

1. **General (Office Areas):** Provide bare panels without factory-applied floor coverings in areas scheduled to receive carpeting.
2. **Computer Rooms:** Provide factory-applied floor coverings of type indicated that are laminated by access flooring manufacturer to tops of floor panels including perforated panels.
3. **Colors, Textures, and Patterns:** As selected by AOC from manufacturer's full range.

4. **Standard Plastic Laminate:** NEMA LD 3, High-Wear type, Grade HWH or HDS; fabricated in one piece to cover each panel face with integral trim serving as edging.
5. **Edging:** Manufacturer's standard integral edge trim. Provide size and profile of applied edge trim that fits floor coverings selected.
6. **Resilient Wall Base:** ASTM F 1861, Type TV (vinyl, thermoplastic), Group 1 (solid), Style B (cove), 0.125 inch (3.18 mm) thick and 4 inches (102 mm) high, with matching end stops and factory-made corner units.

C. **Accessories:**

1. **Adhesives:** Manufacturer's standard adhesive for bonding pedestal bases to subfloor.
2. **Cutouts:** Provide cutouts in floor panels for cable penetrations and service outlets. Provide reinforcement or additional support, if needed, to make panels with cutouts comply with standard performance requirements.

   a. *Number, Size, Shape, and Location:* As indicated.
   b. *Trim edge* of cutouts with manufacturer's standard plastic molding.
   c. *Fit cutouts* with manufacturer's standard grommets in sizes indicated or, if size of cutouts exceeds maximum grommet size available, trim edge of cutouts with manufacturer's standard plastic molding having tapered top flange.
   d. *Provide foam-rubber pads* for sealing annular space formed in cutouts by cables.

3. **Service Outlets:** Standard UL-listed and -labeled assemblies, for recessed mounting flush with top of floor panels, for power, communication, and signal services, and complying with the following requirements:

   a. *Structural Performance:* Cover capable of supporting a 1000-lbf (4448-N) concentrated load.
   b. *Cover and Box Type:* Grommet with twist-close cover and including steel junction box for electrical receptacle with provision for telephone Amphenol connectors and signal cables.
   c. *Location:* In center of panel quadrant, unless otherwise indicated.
   d. *Receptacles and Wiring:* Electrical receptacles and wiring for service outlets are specified in Division 26 Sections.

4. **Diffusers:** Manufacturer's standard round diffusers, 4 inches (102 mm) or 8 inches (203 mm) in diameter, formed from aluminum to produce a removable 1-piece unit complete with diffuser, manually adjustable flow regulator, dirt and dust receptacle, trim ring, and underfloor compression mounting ring; precisely fitted in factory-prepared openings of standard field panels, and complying with the following requirements:

   a. *Structural Performance:* Capable of supporting a 600-lbf (2669-N) concentrated load.
   b. *Fire-Test-Response Characteristics:* Classified 94V-0 per UL 94.

5. **Floor Grilles:** Standard load-bearing grilles formed from aluminum to produce removable one-piece unit precisely fitted in factory-prepared openings of standard field panels, with adjustable/removable dampers and complying with the following requirements:

   a. *Air-Distribution Characteristics:* 468 cfm at 0.10-inch wg (221 L/s at 25-Pa) static pressure.
   b. *Structural Performance:* Capable of supporting a 1000-lbf (4448-N) concentrated load.
   c. *Fire-Test-Response Characteristics:* Classified 94V-0 per UL 94.

6. **Cavity Dividers:** Provide manufacturer's standard metal dividers located where indicated to divide underfloor cavities.
7. **Vertical Closures (Fasciae):** Where underfloor cavity is not enclosed by abutting walls or other construction, provide metal-closure plates with manufacturer's standard finish.
8. **Ramps:** Manufacturer's standard ramp construction of width and slope indicated but not steeper than 1:12, with raised-disc or textured rubber or vinyl floor coverings, and of same materials, performance, and construction requirements as access flooring.
9. **Steps:** Provide steps of size and arrangement indicated with floor coverings to match access flooring. Apply nonslip aluminum nosings to treads, unless otherwise indicated.
10. **Railings:** Standard extruded-aluminum railings, at ramps and open-sided perimeter of access flooring where indicated. Include handrail, intermediate rails, posts, brackets, end caps, wall returns, wall and floor flanges, plates, and anchorages where required.

    a. *Provide railings* that comply with structural performance requirements specified in Division 05 Section "Pipe and Tube Railings."

11. **Panel Lifting Device:** Manufacturer's standard portable lifting device of type required for specified panels. Provide one lifting devices per room of each type required.
12. **Perimeter Support:** Where indicated, provide manufacturer's standard method for supporting panel edge and forming transition between access flooring and adjoining floor coverings at same level as access flooring.

2.11 EXTERIOR PAINTING

A. **Material Compatibility:** Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. **Block Fillers:**

   1. **Interior/Exterior Latex Block Filler:** MPI #4.

C. **Primers/sealers:**

1. **Alkali-Resistant Primer:** MPI #3.
2. **Bonding Primer (Water Based):** MPI #17.
3. **Bonding Primer (Solvent Based):** MPI #69.
4. **Wood-Knot Sealer:** Sealer recommended in writing by topcoat manufacturer for use in paint system indicated.

D. **Metal Primers:**

1. **Alkyd Anti-corrosive Metal Primer:** MPI #79.
2. **Quick-Drying Alkyd Metal Primer:** MPI #76.
3. **Cementitious Galvanized-Metal Primer:** MPI #26.
4. **Quick-Drying Primer for Aluminum:** MPI #95.

E. **Wood Primers:**

1. **Exterior Latex Wood Primer:** MPI #6.
2. **Exterior Alkyd Wood Primer:** MPI #5.
3. **Exterior Oil Wood Primer:** MPI #7.

F. **Exterior Latex Paints:**

1. **Exterior Latex (Flat):** MPI #10 (Gloss Level 1).
2. **Exterior Latex (Semigloss):** MPI #11 (Gloss Level 5).
3. **Exterior Latex (Gloss):** MPI #119 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).

G. **Exterior Alkyd Paints:**

1. **Exterior Alkyd Enamel (Flat):** MPI #8 (Gloss Level 1).
2. **Exterior Alkyd Enamel (Semigloss):** MPI #94 (Gloss Level 5).
3. **Exterior Alkyd Enamel (Gloss):** MPI #9 (Gloss Level 6).

H. **Quick-drying Enamels:**

1. **Quick-Drying Enamel (Semigloss):** MPI #81 (Gloss Level 5).
2. **Quick-Drying Enamel (High Gloss):** MPI #96 (Gloss Level 7).

I. **Aluminum Paint:**

1. **Aluminum Paint:** MPI #1.

J. **Floor Coatings:**

1. **Interior/Exterior Clear Concrete Floor Sealer (Water Based):** MPI #99.
2. **Interior/Exterior Clear Concrete Floor Sealer (Solvent Based):** MPI #104.

3. **Interior/Exterior Latex Floor and Porch Paint (Low Gloss):** MPI #60 (maximum Gloss Level 3).
4. **Exterior/Interior Alkyd Floor Enamel (Gloss):** MPI #27 (Gloss Level 6).

2.12 INTERIOR PAINTING

A. **Paint, General:**

1. **Material Compatibility:** Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2. **Chemical Components of Field-Applied Interior Paints and Coatings:** Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions; these requirements do not apply to primers or finishes that are applied in a fabrication or finishing shop:

   a. *Flat Paints and Coatings:* VOC content of not more than 50 g/L.
   b. *Non-flat Paints and Coatings:* VOC content of not more than 150 g/L.
   c. *Aromatic Compounds:* Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

3. **Colors:** As selected by AOC from manufacturer's full range.

B. **Block Fillers:**

1. **Interior/Exterior Latex Block Filler:** MPI #4.

C. **Primers/sealers:**

1. **Interior Latex Primer/Sealer:** MPI #50.
2. **Interior Alkyd Primer/Sealer:** MPI #45.
3. **Wood-Knot Sealer:** Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

D. **Metal Primers:**

1. **Alkyd Anticorrosive Metal Primer:** MPI #79.
2. **Quick-Drying Alkyd Metal Primer:** MPI #76.
3. **Rust-Inhibitive Primer (Water Based):** MPI #107.
4. **Cementitious Galvanized-Metal Primer:** MPI #26.
5. **Vinyl Wash Primer:** MPI #80.

6. **Quick-Drying Primer for Aluminum:** MPI #95.

E. **Wood Primers:**

1. **Interior Latex-Based Wood Primer:** MPI #39.

F. **Latex Paints:**

1. **Interior Latex (Flat):** MPI #53 (Gloss Level 1).
2. **Interior Latex (Semigloss):** MPI #54 (Gloss Level 5).
3. **Interior Latex (Gloss):** MPI #114 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).
4. **High-Performance Architectural Latex (Low Sheen):** MPI #138 (Gloss Level 2).
5. **High-Performance Architectural Latex (Semigloss):** MPI #141 (Gloss Level 5).

PART 3 - EXECUTION

3.1 GYPSUM BOARD SYSTEMS

A. **Examination:** Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

1. **Examine panels** before installation. Reject panels that are wet, moisture damaged, and mold damaged.

B. **Preparation:**

1. **Suspended Assemblies:** Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
2. **Coordination with Sprayed Fire-Resistive Materials:**

   a. *Before sprayed fire-resistive materials* are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (600 mm) o.c.
   b. *After sprayed fire-resistive materials* are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

C. **Installation, General:**

1. **Installation Standard:** ASTM C 754, except comply with framing sizes and spacing indicated.

   a. *Gypsum Plaster Assemblies:* Also comply with requirements in ASTM C 841 that apply to framing installation.
   b. *Gypsum Board Assemblies:* Also comply with requirements in ASTM C 840 that apply to framing installation.

2. **Install supplementary framing**, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
3. **Install bracing** at terminations in assemblies.
4. **Do not bridge building control** and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

D. **Installing Suspension Systems:** Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

1. **Isolate suspension systems** from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
2. **Suspend hangers** from building structure as follows:

   a. *Install hangers plumb* and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   b. *Where width of ducts* and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
   c. *Wire Hangers:* Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
   d. *Flat Hangers:* Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
   e. *Do not attach hangers* to steel roof deck. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
   f. *Do not attach hangers* to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
   g. *Do not connect* or suspend steel framing from ducts, pipes, or conduit.

3. **Fire-Resistance-Rated Assemblies:** Wire tie furring channels to supports.
4. **Seismic Bracing**: Sway-brace suspension systems with hangers used for support.
5. **Grid Suspension Systems:** Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
6. **Installation Tolerances:** Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

E. **Installing Framed Assemblies:**

1. **Where studs** are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
2. **Install studs** so flanges within framing system point in same direction. Space studs as follows:

   a. *Single-Layer Application:* 16 inches (406 mm) o.c., unless otherwise indicated.
   b. *Multilayer Application:* 16 inches (406 mm) o.c., unless otherwise indicated.
   c. *Tile backing panels:* 16 inches (406 mm) o.c., unless otherwise indicated.

3. **Install tracks (runners)** at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

   a. *Slip-Type Head Joints:* Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
   b. *Door Openings:* Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

      1) Install two studs at each jamb, unless otherwise indicated.
      2) Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (12.7-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
      3) Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

   c. *Other Framed Openings:* Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
   d. *Fire-Resistance-Rated Partitions:* Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

1) Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

e. *Sound-Rated Partitions:* Install framing to comply with sound-rated assembly indicated.

4. **Direct Furring:** Screw to wood or steel framing. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
5. **Z-Furring Members:** Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (600 mm) o.c. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (300 mm) from corner and cut insulation to fit.

   a. *Where indicated*, erect insulation vertically and hold in place with Z-furring members.

6. **Installation Tolerance:** Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

F. **Applying and Finishing Panels, General:** Comply with ASTM C 840. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

1. **Install panels** with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
2. **Locate edge and end joints** over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
3. **Form control and expansion joints** with space between edges of adjoining gypsum panels.
4. **Cover both faces** of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

   a. *Unless concealed application* is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
   b. *Fit gypsum panels* around ducts, pipes, and conduits.

c. *Where partitions intersect* structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

5. **Isolate perimeter of gypsum board** applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
6. **Attachment to Steel Framing:** Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
7. **Wood Framing:** Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.
8. **STC-Rated Assemblies:** Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

G. **Applying Interior Gypsum Board:**

1. **Install interior gypsum board** in the following locations:

a. *Regular Type:* Vertical surfaces, unless otherwise indicated.
b. *Type X:* Where required for fire-resistance-rated assembly.
c. *Type C:* Where required for specific fire-resistance-rated assembly indicated.
d. *Ceiling Type:* Ceiling surfaces.
e. *Moisture- and Mold-Resistant Type:* Non-tiled areas of restrooms and toilet areas.

2. **Single-Layer Application:**

a. *On ceilings*, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
b. *On partitions/walls*, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

1) Stagger abutting end joints not less than one framing member in alternate courses of panels.
2) At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

c. *On Z-furring members*, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

d. *Fastening Methods:* Apply gypsum panels to supports with steel drill screws.

3. **Multilayer Application:**

a. *On ceilings*, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
b. *On partitions/walls*, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
c. *On Z-furring members*, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
d. *Fastening Methods:* Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

4. **Laminating to Substrate:** Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

H. **Applying Tile Backing Panels:**

1. **Cementitious Backer Units:** ANSI A108.11, at showers, tubs, and at locations indicated to receive tile.
2. **Areas Not Subject to Wetting (Restrooms, Public Toilets, etc.):** Install water-resistant gypsum board to produce a flat surface adjacent to showers, tubs, and other locations indicated to receive cementitious backer units.
3. **Where tile backing panels** abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

I. **Installing Trim Accessories:** For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

1. **Control Joints:** Install control joints according to ASTM C 840 and in specific locations approved by AOC for visual effect.
2. **Interior Trim:** Install in the following locations:

a *Cornerbead:* Use at outside corners.
b. *LC-Bead:* Use at exposed panel edges.

c. *L-Bead:* Use where indicated.
d. *U-Bead:* Use at exposed panel edges.
e. *Curved-Edge Cornerbead:* Use at curved openings.

3. **Exterior Trim:** Install in the following locations:

a. *Cornerbead:* Use at outside corners.
b. *LC-Bead:* Use at exposed panel edges.

4. **Aluminum Trim:** Install in locations indicated on Drawings.

J. **Finishing Gypsum Board:** Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

1. **Prefill open joints**, rounded or beveled edges, and damaged surface areas.
2. **Apply joint tape** over gypsum board joints, except those with trim having flanges not intended for tape.
3. **Gypsum Board Finish Levels:** Finish panels to levels indicated below and according to ASTM C 840 and in conformance with C101 in the *AOC Design Standards:*

Location	System	Finish	Trim
Member's Offices	Gypsum Plaster	Level 4	Embedded galv. trim
Staff Offices & Conf. Rooms	Single layer 1/2"	Level 3	Reveal or embedded galv. trim
Corridors and Lobbies	Single layer 5/8"	Level 4	Embedded galv. trim
Monumental/Formal	Double 5/8"	Level 5	Embedded galv. trim
Service or support areas	Single layer 5/8"	Level 3	Reveal or embedded galv. trim
Closets, concealed areas	Single layer 1/2"	Level 2	Reveal or embedded galv. trim

4. **Cementitious Backer Units:** Finish according to manufacturer's written instructions.

K. **Protection:** Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period. Remove and replace panels that are wet, moisture damaged, and mold damaged.

3.2 TILING

A. **Examination:** Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated. Verify that installation of grounds, anchors, recessed frames, electrical and

mechanical units of work, and similar items located in or behind tile has been completed before installing tile. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect. Proceed with installation only after unsatisfactory conditions have been corrected.

B. **Preparation:**

1. **Remove coatings**, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
2. **Provide concrete substrates** for tile floors installed with adhesives or thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer. Remove protrusions, bumps, and ridges by sanding or grinding.
3. **Blending:** For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
4. **Field-Applied Temporary Protective Coating:** Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

C. **Installation, General:** Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

1. **Extend tile work** into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
2. **Accurately form** intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
3. **Jointing Pattern:** Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

   a. *For tile mounted in sheets*, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

4. **Lay out** tile wainscots to next full tile beyond dimensions indicated.

5. **Expansion Joints:** Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

   a. *Locate joints* in tile surfaces directly above joints in concrete substrates.
   b. *Prepare joints* and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

6. **Grout tile** to comply with requirements of the following tile installation standards:

   a. *For ceramic tile grouts* (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.
   b. *For chemical-resistant epoxy grouts*, comply with ANSI A108.6.

7. **At showers, tubs, and where indicated**, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

D. **Waterproofing Installation:** Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.

1. **Install crack-suppression membrane** to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.
2. **Do not install tile** over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

E. **Floor Tile Installation:**

1. **General:** Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.

   a. *For installations indicated below*, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.

      1) Exterior tile floors.
      2) Tile floors in wet areas.
      3) Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
      4) Tile floors composed of rib-backed tiles.

   b. *Joint Widths:* Install tile on floors with the following joint widths:

      1) Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
      2) Quarry Tile: 1/4 inch (6.35 mm).

2. **Stone Thresholds:** Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.
3. **Metal Edge Strips:** Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
4. **Grout Sealer:** Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

F. **Wall Tile Installation:** Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

1. **Install metal lath** and scratch coat for walls to comply with ANSI A108.1A, Section 4.1.
2. **Joint Widths:** Install tile on walls with the following joint widths:

   a. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
   b. Glazed Wall Tile: 1/16 inch (1.6 mm).
   c. Quarry Tile: 1/4 inch (6.35 mm).

G. **Cleaning and Protecting:**

1. **Cleaning:** On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter. Remove grout residue from tile as soon as possible. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
2. **Protection:** When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.3 ACOUSTICAL SYSTEMS

A. **Examination:** Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage

and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings. Proceed with installation only after unsatisfactory conditions have been corrected.

B. **Preparation:** Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

C. **Installation:** Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook." Install fire-rated ceiling systems according to tested fire-rated design.

1. **Suspend ceiling hangers** from building's structural members and as follows:

   a. *Install hangers plumb* and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   b. *Splay hangers* only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
   c. *Where width of ducts* and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
   d. *Secure wire hangers* to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   e. *Secure flat*, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
   f. *Do not support ceilings* directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
   g. *When steel framing* does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
   h. *Do not attach hangers* to steel deck tabs or steel roof deck. Attach hangers to structural members.
   i. *Space hangers* not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.

j. *Size supplemental* suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

2. **Secure bracing wires** to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.
3. **Install edge moldings and trim** of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

   a. *Apply acoustical sealant* in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
   b. *Screw attach moldings* to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
   c. *Do not use exposed fasteners*, including pop rivets, on moldings and trim.

4. **Install suspension system runners** so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
5. **Install acoustical panels** with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit. Install panels in a basket-weave pattern.

   a. *For square-edged panels*, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
   b. *For reveal-edged panels* on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
   c. *For reveal-edged panels* on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
   d. *Paint cut edges* of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
   e. *Install hold-down clips* in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.
   f. *Protect lighting fixtures* and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

D. **Tests and Inspections:** The AOC reserves the right to test and inspect completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages, in areas of extent and using methods as follows: Tests may be conducted when installation of ceiling suspension systems within the test area has reached 20 percent completion but no panels have been installed.

1. **Within each test area**, the AOC will select 1 of every 10 power-actuated fasteners and post-installed anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every 2 post-installed anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
2. **When testing discovers** fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
3. **Remove and replace** acoustical panel ceiling hangers and anchors and fasteners that do not pass tests and inspections and retest as specified above.

E. **Cleaning:** Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.4 ACCESS FLOORING

A. **Examination:** Examine substrates, with Installer and manufacturer's representative present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify that substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, foreign deposits, and debris that might interfere with attachment of pedestals. Proceed with installation only after unsatisfactory conditions have been corrected.

1. **Pre-installation Adhesive Field Test:** Before installing pedestals, field test their adhesion to subfloor surfaces as follows:

   a. In areas representative of each subfloor surface, set typical pedestal assemblies in same adhesive and methods required for completed work.
   b. Allow test installation to cure for 30 days, with a pressure of 25 lbf (111 N) applied vertically to pedestals during this period.
   c. After curing, apply lateral load against a straight steel bar inserted 2 inches (51 mm) into pedestal stems. Measure the force needed to cause adhesive failure of pedestal base.
   d. Proceed with installation only after tests show compliance with performance requirement specified for pedestals' capability to resist overturning moment.

B. **Preparation:** Lay out floor panel installation to keep the number of cut panels at floor perimeter to a minimum. Avoid using panels cut to less than 6 inches (152 mm).

1. **Locate each pedestal**, complete any necessary subfloor preparation, and vacuum clean subfloor to remove dust, dirt, and construction debris before beginning installation.

C. **Installation:** Install access flooring system and accessories under supervision of access flooring manufacturer's authorized representative to produce a rigid, firm installation that

complies with performance requirements and is free of instability, rocking, rattles, and squeaks.

1. **Set pedestals** in adhesive as recommended in writing by access flooring manufacturer to provide full bearing of pedestal base on subfloor.
2. **Attach pedestals** to subfloor by post-installed mechanical anchors.
3. **Adjust pedestals** to permit top of installed panels to be set flat, level, and to proper height.
4. **Secure stringers** to pedestal heads according to access flooring manufacturer's written instructions.
5. **Install flooring panels** securely in place, properly seated with panel edges flush. Do not force panels into place.
6. **Scribe perimeter panels** to provide a close fit with adjoining construction with no voids greater than 1/8 inch (3 mm) where panels abut vertical surfaces.
7. **Cut and trim** access flooring and perform other dirt-or-debris-producing activities at a remote location or as required to prevent contamination of subfloor under access flooring already installed.
8. **Ground flooring system** as recommended by manufacturer and as needed to comply with performance requirements for electrical resistance of floor coverings.
9. **Scribe and install** underfloor-cavity dividers to closely fit against subfloor surfaces, and seal with mastic.
10. **Scribe vertical closures** to closely fit against subfloor and adjacent finished-floor surfaces. Set in mastic and seal to maintain plenum effect within underfloor cavity.
11. **Clean dust**, dirt, and construction debris caused by floor installation, and vacuum subfloor area, as installation of floor panels proceeds.
12. **Seal underfloor air cavities** at construction seams, penetrations, and perimeter to control air leakage as recommended in writing by manufacturer.
13. **Install access flooring** without change in elevation between adjacent panels and within the following tolerances:

    a. *Computer Rooms:* Plus or minus 1/16 inch (1.5 mm) in any 10-foot (3-m) distance.
    b. *Carpeted Office Areas:* Plus or minus 1/8 inch (3 mm) in any 10-foot (3-m) distance.

D. **Adjusting, Cleaning, and Protection:** Prohibit traffic on access flooring for 24 hours and removal of floor panels for 72 hours after installation to allow pedestal adhesive to set. After completing installation, vacuum clean access flooring and cover with continuous sheets of reinforced paper or plastic. Maintain protective covering until time of Substantial Completion. Replace access flooring panels that are stained, scratched, or otherwise damaged or that do not comply with specified requirements.

3.5 EXTERIOR PAINTING

A. **Concrete Substrates, Nontraffic Surfaces:**

1. **Latex Over Alkali-Resistant Primer System:** MPI EXT 3.1K.

   a. *Prime Coat:* Alkali-resistant primer.
   b. *Intermediate Coat:* Exterior latex matching topcoat.
   c. *Topcoat:* Exterior latex (semigloss, or as indicated).

B. **Clay-Masonry Substrates:**

1. **Latex System:** MPI EXT 4.1A.

   a. *Prime Coat:* Exterior latex matching topcoat.
   b. *Intermediate Coat:* Exterior latex matching topcoat.
   c. *Topcoat:* Exterior latex (semigloss, or as indicated).

C. **CMU Substrates:**

1. **Latex System:** MPI EXT 4.2A.

   a. *Prime Coat:* Interior/exterior latex block filler.
   b. *Intermediate Coat:* Exterior latex matching topcoat.
   c. *Topcoat:* Exterior latex (semigloss, or as indicated).

D. **Steel Substrates:**

1. **Quick-Drying Enamel System:** MPI EXT 5.1A.

   a. *Prime Coat:* Quick-drying alkyd metal primer.
   b. *Intermediate Coat:* Quick-drying enamel matching topcoat.
   c. *Topcoat:* Quick-drying enamel (semigloss or high gloss, as indicated).

2. **Alkyd System:** MPI EXT 5.1D.

   a. *Prime Coat:* Alkyd anti-corrosive metal primer.
   b. *Intermediate Coat:* Exterior alkyd enamel matching topcoat.
   c. *Topcoat:* Exterior alkyd enamel (semigloss or gloss, as indicated).

E. **Galvanized-Metal Substrates:**

1. **Alkyd System:** MPI EXT 5.3B.

   a. *Prime Coat:* Cementitious galvanized-metal primer.
   b. *Intermediate Coat:* Exterior alkyd enamel matching topcoat.
   c. *Topcoat:* Exterior alkyd enamel (semigloss or gloss, as indicated).

F. **Aluminum Substrates:**

1. **Latex System:** MPI EXT 5.4H.

   a. *Prime Coat:* Quick-drying primer for aluminum.
   b. *Intermediate Coat:* Exterior latex matching topcoat.
   c. *Topcoat:* Exterior latex (semigloss or gloss, as indicated).

G. **Dressed Lumber Substrates:** Including architectural woodwork, doors, windows, etc.:

1. **Latex Over Alkyd Primer System:** MPI EXT 6.3A.

   a. *Prime Coat:* Exterior alkyd or oil wood primer.
   b. *Intermediate Coat:* Exterior latex matching topcoat.
   c. *Topcoat:* Exterior latex (semigloss or gloss, as indicated).

H. **Wood Panel Substrates:** Including plywood siding, fascias, soffits, etc.:

1. **Latex System:** MPI EXT 6.4K.

   a. *Prime Coat:* Exterior latex wood primer.
   b. *Intermediate Coat:* Exterior latex matching topcoat.
   c. *Topcoat:* Exterior latex (semigloss or gloss, or as indicated).

I. **Dimension Lumber Substrates, Non-traffic Surfaces:** Including fencing, etc.:

1. **Latex Over Alkyd Primer System:** MPI EXT 6.2A.

   a. *Prime Coat:* Exterior alkyd or oil wood primer.
   b. *Intermediate Coat:* Exterior latex matching topcoat.
   c. *Topcoat:* Exterior latex (semigloss or gloss, or as indicated).

J. **Dimension Lumber Substrates, Traffic Surfaces:** Including lumber decking, stairs, etc.:

1. **Alkyd Floor Enamel System:** MPI EXT 6.5B.

   a. *Prime Coat:* Exterior/interior alkyd floor enamel (gloss).
   b. *Intermediate Coat:* Exterior/interior alkyd floor enamel (gloss).
   c. *Topcoat:* Exterior/interior alkyd floor enamel (gloss).

      1) With additive to increase skid resistance of painted surface.

3.6 INTERIOR PAINTING

A. **Concrete Substrates, Non-traffic Surfaces:**

1. **Latex Over Sealer System:** MPI INT 3.1A.

a. *Prime Coat:* Interior latex primer/sealer.
b. *Intermediate Coat:* Interior latex matching topcoat.
c. *Topcoat:* Interior latex (semigloss, or as indicated).

2. **High-Performance Architectural Latex System:** MPI INT 3.1C.

a. *Prime Coat:* Interior latex primer/sealer.
b. *Intermediate Coat:* High-performance architectural latex matching topcoat.
c. *Topcoat:* High-performance architectural latex **(**satin or semigloss, as indicated).

B. **Clay-Masonry Substrates:**

1. **High-Performance Architectural Latex System:** MPI INT 4.1L.

a. *Prime Coat:* High-performance architectural latex matching topcoat.
b. *Intermediate Coat:* High-performance architectural latex matching topcoat.
c. *Topcoat:* High-performance architectural latex **(**semigloss**)**.

C. **CMU Substrates:**

1. **High-Performance Architectural Latex System (Mechanical/Service Areas/Restrooms)**: MPI INT 4.2D.

a. *Prime Coat:* Interior/exterior latex block filler.
b. *Intermediate Coat:* High-performance architectural latex matching topcoat.
c. *Topcoat:* High-performance architectural latex **(**semigloss).

2. **High-Performance Architectural Latex System (Workrooms, etc.):** MPI INT 4.2D.

a. *Prime Coat:* Interior/exterior latex block filler.
b. *Intermediate Coat:* High-performance architectural latex matching topcoat.
c. *Topcoat:* High-performance architectural latex **(**eggshell or satin**)**.

D. **Steel Substrates:**

1. **Quick-Drying Enamel System:** MPI INT 5.1A.

a. *Prime Coat:* Quick-drying alkyd metal primer.
b. *Intermediate Coat:* Quick-drying enamel matching topcoat.
c. *Topcoat:* Quick-drying enamel (high gloss).

2. **Alkyd System:** MPI INT 5.1E.

a. *Prime Coat:* Alkyd anti-corrosive metal primer.
b. *Intermediate Coat:* Interior alkyd matching topcoat.
c. *Topcoat:* Interior alkyd (gloss).

3. **High-Performance Architectural Latex System:** MPI INT 5.1R.

   a. *Prime Coat:* Alkyd anti-corrosive metal primer.
   b. *Intermediate Coat:* High-performance architectural latex matching topcoat.
   c. *Topcoat:* High-performance architectural latex (eggshell, satin, or semigloss, as indicated).

E. **Galvanized-Metal Substrates:**

1. **Latex System:** MPI INT 5.3A.

   a. *Prime Coat:* Cementitious galvanized-metal primer.
   b. *Intermediate Coat:* Interior latex matching topcoat.
   c. *Topcoat:* Interior latex (semigloss, or as indicated).

2. **Alkyd System:** MPI INT 5.3C.

   a. *Prime Coat:* Cementitious galvanized-metal primer.
   b. *Intermediate Coat:* Interior alkyd matching topcoat.
   c. *Topcoat:* Interior alkyd (semigloss, or as indicated).

F. **Dressed Lumber Substrates:** Including architectural woodwork, doors.

1. **Latex Over Alkyd Primer System:** MPI INT 6.4A.

   a. *Prime Coat:* Interior alkyd primer/sealer.
   b. *Intermediate Coat:* Interior latex matching topcoat.
   c. *Topcoat:* Interior latex (eggshell, satin, semigloss, or gloss, as indicated).

G. **Wood Panel Substrates:** Including painted plywood, medium-density fiberboard, or hardboard.

1. **Latex Over Alkyd Primer System:** MPI INT 6.4A.

   a. *Prime Coat:* Interior alkyd primer/sealer.
   b. *Intermediate Coat:* Interior latex matching topcoat.
   c. *Topcoat:* Interior latex (eggshell, satin, semigloss, or gloss, as indicated).

H. **Gypsum Board Substrates:**

1. **Latex System:** MPI INT 9.2A.

   a. *Prime Coat:* Interior latex primer/sealer.
   b. *Intermediate Coat:* Interior latex matching topcoat.

c. *Topcoat:* Interior latex (flat or low sheen, or as indicated). Do not use gloss over gypsum board substrates without AOC approval.

I. **Plaster Substrates:**

a. *Latex System:* MPI INT 9.2A.

a. *Prime Coat:* Interior latex primer/sealer.
b. *Intermediate Coat:* Interior latex matching topcoat.
c. *Topcoat:* Interior latex (flat or low sheen, or as indicated).

K. **Cotton or Canvas Insulation-Covering Substrates:** Including pipe and duct coverings.

1. **Latex System:** MPI INT 10.1A.

a. *Prime Coat:* Interior latex primer/sealer.
b. *Intermediate Coat:* Interior latex matching topcoat.
c. *Topcoat:* Interior latex (semigloss).

END OF DIVISION NINE

DIVISION TEN - SPECIALITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes units as follows:

1. **Toilet Enclosures:** Ceiling-hung (and limited installations of Overhead-Braced Units and Floor-Anchored Units).
2. **Entrance Screens:** Ceiling-hung.
3. **Urinal Screens:** Wall hung.
4. **Public-use washroom accessories.**
5. **Private-use bathroom accessories.**
6. **Childcare accessories.**
7. **Custodial accessories.**

1.3 SUBMITTALS

A. **Product Data:** For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. **Shop Drawings:** Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of cutouts for compartment-mounted toilet accessories.
2. Show locations of reinforcements for compartment-mounted grab bars.

C. **Samples for Initial Selection:** For each type of unit indicated.

D. **Samples for Verification:** Of each type of color and finish required for units, prepared on 6-inch- (150-mm-) square Samples of same thickness and material indicated for Work.

E. **Product Schedule:** For toilet and bath accessories indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. **Identify products** using designations indicated on Drawings.

F. **Maintenance Data:** For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. **Comply** with requirements in CID-A-A-60003, "Partitions, Toilets, Complete."

B. **Source Limitations:** For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Architect.

C. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 PROJECT CONDITIONS

A. **Field Measurements:** Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.

1. **Established Dimensions:** Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating toilet compartments without field measurements. Coordinate wall, floor, ceilings, and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

1.6 COORDINATION

A. **Coordinate accessory** locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. **Deliver inserts and anchoring devices** set into concrete or masonry as required to prevent delaying the Work. See Division 05 for supports that attach ceiling-hung and floor-and-ceiling-anchored units to overhead structural system.

1.7 WARRANTY

A. **Special Mirror Warranty:** Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. **Warranty Period:** 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TOILET COMPARTMENTS

A. **Baked-Enamel Units:** Facing sheets and closures fabricated from ASTM A 591/A 591M, 80Z (24G) (electrolytically zinc-coated), commercial steel sheet for exposed applications, that is mill phosphatized, and selected for smoothness.

1. **Facing Sheet Thicknesses:** Minimum base-metal (uncoated) thicknesses as follows:

   a. *Pilasters, Braced at Both Ends:* Manufacturer's standard thickness, but not less than 0.0478 inch (1.2 mm).
   b. *Pilasters, Unbraced at One End:* Manufacturer's standard thickness, but not less than 0.0478 inch (1.2 mm).
   c. *Panels:* Manufacturer's standard thickness, but not less than 0.0359 inch (0.9 mm).
   d. *Doors:* Manufacturer's standard thickness, but not less than 0.0299 inch (0.75 mm).
   e. *Integral-Flange, Wall-Hung Urinal Screens:* Manufacturer's standard thickness, but not less than 0.0312 inch (0.8 mm).

2. **Finish:** Manufacturer's standard pigmented, organic coating, including thermosetting, electrostatically applied, and powder coatings. Provide coating system that complies with coating manufacturer's written instructions for pretreatment, application, baking, and minimum dry film thickness.

   a. *Color:* One color in each room as selected by AOC from manufacturer's full range of colors.

B. **Door, Panel, and Pilaster Construction:** Seamless, metal facing sheets are pressure laminated to core material. Units have continuous, interlocking molding strip or lapped and formed edge closures. Exposed surfaces are free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections. Corners are sealed by welding or clips. Exposed welds are ground smooth.

1. **Core Material:** Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch (25 mm) for doors and panels and 1-1/4 inches (32 mm) for pilasters.
2. **Grab-Bar Reinforcement:** Provide concealed internal reinforcement for grab bars mounted on units.
3. **Tapping Reinforcement:** Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.
4. **Urinal-Screen Construction:** Matching panels.

C. **Pilaster Shoes and Sleeves (Caps):** Stainless steel, ASTM A 666, Type 302 or 304, not less than 0.0312 inch (0.8 mm) specified thickness and 3 inches (75 mm) high, finished to match hardware.

D. **Brackets (Fittings):** Stirrup Type - Ear or U-brackets, chrome-plated, nonferrous, cast zinc alloy (zamac) or stainless steel.

E. **Fabrication:**

1. **Overhead-Braced Units:** Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.
2. **Floor-Anchored Units:** Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
3. **Ceiling-Hung Units:** Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters for connection to structural support above finished ceiling. Provide assemblies that support pilasters from structure without transmitting load to finished ceiling. Provide sleeves (caps) at tops of pilasters to conceal anchorage.
4. **Doors:** Unless otherwise indicated, provide 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments indicated to be accessible to people with disabilities.

    a. **Hinges:** Manufacturer's standard self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
    b. **Latch and Keeper:** Manufacturer's standard recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
    c. **Coat Hook:** Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
    d. **Door Bumper:** Manufacturer's standard rubber-tipped bumper at out-swinging doors and entrance screen doors.
    e. **Door Pull:** Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

2.2 TOILET, BATH, AND LAUNDRY ACCESSORIES

A. **Materials:**

1. **Stainless Steel:** ASTM A 666, Type 304, 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.
2. **Brass:** ASTM B 19 flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
3. **Steel Sheet:** ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch (0.9-mm) minimum nominal thickness.
4. **Galvanized Steel Sheet:** ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
5. **Galvanized Steel Mounting Devices:** ASTM A 153/A 153M, hot-dip galvanized after fabrication.
6. **Fasteners:** Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
7. **Chrome Plating:** ASTM B 456, Service Condition Number SC 2 (moderate service).
8. **Mirrors:** ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
9. **ABS Plastic:** Acrylonitrile-butadiene-styrene resin formulation.

B. **Staff and Public-use Washroom Accessories:**

1. **Toilet Tissue (Roll) Dispenser:**

   a. **Description:** Roll-in-reserve dispenser with hinged front secured with tumbler lockset.
   b. **Mounting:** Surface mounted.
   c. **Operation:** Non-control delivery with standard spindle .
   d. **Capacity:** Designed for 4-1/2- or 5-inch- (114- or 127-mm-) diameter tissue rolls.
   e. **Material and Finish:** Stainless steel, No. 4 finish (satin).

2. **Paper Towel (Folded) Dispenser (Staff Restrooms):**

   a. **Mounting:** Recessed or Semi-recessed, as construction permits.
   b. **Minimum Capacity:** 575 C-fold .
   c. **Material and Finish:** Stainless steel, No. 4 finish (satin).
   d. **Lockset:** Tumbler type.
   e. **Refill Indicators:** Pierced slots at sides or front.

3. **Paper Towel (Roll) Dispenser (Public Restrooms):**

   a. **Description:** Lever-actuated mechanism permits controlled delivery of paper rolls in preset lengths per stroke.
   b. **Mounting:** Recessed or Semi-recessed, as construction permits.
   c. **Minimum Capacity:** 8-inch (203-mm) wide, 800-foot (244-m) long roll.
   d. **Material and Finish:** Stainless steel, No. 4 finish (satin).
   e. **Lockset:** Tumbler type.

4. **Waste Receptacle:**

   a. **Mounting:** Self-closing disposal-opening cover, recessed, where possible, or Semi-recessed.
   b. **Minimum Capacity:** 9 or 12 gals.
   c. **Material and Finish:** Stainless steel, No. 4 finish (satin).
   d. **Liner:** Reusable vinyl liner.
   e. **Lockset:** Tumbler type for waste-receptacle.

5. **Combination Towel (Folded) Dispenser/Waste Receptacle (Staff Restrooms):**

   a. **Description:** Combination unit for dispensing C-fold or multi-fold towels, with removable waste receptacle.
   b. **Mounting:** Recessed with projecting receptacle or semi-recessed, as construction permits. Designed for nominal 4-inch (100-mm) wall depth.
   c. **Minimum Towel-Dispenser Capacity:** 575 C-fold paper towels.
   d. **Minimum Waste-Receptacle Capacity:** 12 gal. (45.4 L).
   e. **Material and Finish:** Stainless steel, No. 4 finish (satin).
   f. **Liner:** Reusable, vinyl waste-receptacle liner.
   g. **Lockset:** Tumbler type for towel-dispenser compartment.

6. **Combination Towel (Roll) Dispenser/Waste Receptacle (Public Restrooms):**

   a. **Description:** Combination unit for dispensing preset length of roll paper towels, with removable waste receptacle.
   b. **Mounting:** Recessed or Semi-recessed, , as construction permits.
   c. **Minimum Towel-Dispenser Capacity:** 8-inch (203-mm) wide, 800-foot (244-m) long roll.
   d. **Minimum Waste Receptacle Capacity:** 12 gal. (45.4 L).
   e. **Material and Finish:** Stainless steel, No. 4 finish (satin).
   f. **Liner:** Reusable, vinyl waste-receptacle liner.
   g. **Lockset:** Tumbler type for towel dispenser compartment.

7. **Liquid-Soap Dispenser:**

   a. **Description:** Designed for dispensing soap in liquid or lotion form.
   b. **Mounting:** Deck mounted on vanity or deck mounted on lavatory, as appropriate to design.
   c. **Capacity:** 16 oz. when concealed beneath lavatories, 45 oz. when countertop deck mounted.
   d. **Materials:** Exposed portions stainless steel No. 4 finish (satin), reservoir materials ABS or polypropylene.
   e. **Lockset:** Tumbler type.
   f. **Refill Indicator:** Window type.

8. **Grab Bars:**

a. **Mounting:** Flanges with concealed fasteners.
b. **Material:** Stainless steel, 0.05 inch (1.3 mm) thick, finish: Smooth, No. 4, satin finish on ends and slip-resistant texture in grip area.
c. **Outside Diameter:** 1-1/4 inches (32 mm).
d. **Configuration and Length:** As indicated on Drawings.

9. **Vendor:**

a. **Type:** Sanitary napkin and tampon.
b. **Mounting:** Fully recessed, designed for 4-inch (100-mm) wall depth or Semi-recessed, as construction permits.
c. **Capacity:** Minimum - 31 napkins, 22 tampons.
d. **Operation:** Single coin (25 cents).
e. **Exposed Material and Finish:** Stainless steel, No. 4 finish (satin)
f. **Lockset:** Tumbler type with separate lock and key for coin box.

10. **Sanitary-Napkin Disposal Unit:**

a. **Mounting:** Partition mounted, dual access.
b. **Door or Cover:** Self-closing disposal-opening cover and hinged face panel with tumbler lockset.
c. **Receptacle:** Removable.
d. **Material and Finish:** Stainless steel, No. 4 finish (satin).

11. **Seat-Cover Dispenser :**

a. **Mounting:** Surface mounted.
b. **Minimum Capacity:** 250 seat covers.
c. **Exposed Material and Finish:** Stainless steel, No. 4 finish (satin).
d. **Lockset:** Tumbler type.

12. **Fold-Down Purse Shelf:**

a. **Description:** Hinged unit with spring-loaded shelf that automatically returns to vertical position.
b. **Nominal Size:** 15 inches (381 mm) long by 5-1/2 inches (140 mm) wide.
c. **Material and Finish:** Stainless steel, No. 4 finish (satin).

13. **Mirror Unit:**

a. **Frame:** Stainless-steel channel or Stainless steel, fixed tilt (where indicated for accessible units). Corners: Welded and ground smooth.
b. **Integral Shelf:** 5 inches (127 mm) deep.
c. **Hangers:** Produce rigid, tamper- and theft-resistant installation, using method indicated below.

a. *One-piece,* galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
b. *Wall bracket* of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

d. **Size:** As indicated on Drawings.

C. **Private-use Bathroom Accessories:**

1. **Toilet Tissue (Roll) Dispenser:**

a. **Description:** Roll-in-reserve dispenser with hinged front secured with tumbler lockset.
b. **Mounting:** Surface mounted.
c. **Operation:** Non-control delivery with standard spindle .
d. **Capacity:** Designed for 4-1/2- or 5-inch- (114- or 127-mm-) diameter tissue rolls.
e. **Material and Finish:** Stainless steel, No. 4 finish (satin).

2. **Liquid-Soap Dispenser:**

a. **Description:** Designed for dispensing soap in liquid or lotion form.
b. **Mounting:** Deck mounted on vanity or deck mounted on lavatory, as appropriate to design.
c. **Capacity:** 16 oz. when concealed beneath lavatories, 45 oz. when countertop deck mounted.
d. **Materials:** Exposed portions stainless steel No. 4 finish (satin), reservoir materials ABS or polypropylene.
e. **Lockset:** Tumbler type.
f. **Refill Indicator:** Window type.

3 **Combination Towel (Folded) Dispenser/Waste Receptacle (Private Restrooms):**

a. **Description:** Combination unit for dispensing C-fold or multi-fold towels, with removable waste receptacle.
b. **Mounting:** Recessed with projecting receptacle or semi-recessed, as construction permits. Designed for nominal 4-inch (100-mm) wall depth.
c. **Minimum Towel-Dispenser Capacity:** 300 C-fold paper towels.
d. **Minimum Waste-Receptacle Capacity:** 2 gal. (8 L).
e. **Material and Finish:** Stainless steel, No. 4 finish (satin).
f. **Liner:** Reusable, vinyl waste-receptacle liner.

4. **Medicine Cabinet:**

a. **Mounting:** Recessed, for nominal 4-inch (100-mm) wall depth.
b. **Size:** 18 by 24 inches (460 by 610 mm), or as indicated.

c. **Door:** Framed mirror door concealing storage cabinet equipped with continuous hinge and spring-buffered, rod-type stop and magnetic door catch.
d. **Shelves:** Three, adjustable.
e. **Material and Finish:** Cabinet: steel with corrosion resistant finish; mirror frame: Stainless steel, No. 4 finish (satin); shelves: tempered glass.

D. **Childcare Accessories (General Public Restrooms Only):**

1. **Diaper-Changing Station:**

a. **Description:** Horizontal unit that opens by folding down from stored position and with child-protection strap. Engineered to support a minimum of 250-lb (113-kg) static load when opened.
b. **Mounting:** Surface mounted, with unit projecting not more than 4 inches (100 mm) from wall when closed.
c. **Operation:** By pneumatic shock-absorbing mechanism.
d. **Material and Finish:** High-density polyethylene with plastic laminate insert in color selected by AOC.
e. **Liner Dispenser:** Built in.

E. **Custodial Accessories (Janitor's Closets):**

1 **Utility Shelf:**

a. **Description:** With exposed edges turned down not less than 1/2 inch (12.7 mm) and supported by two triangular brackets welded to shelf underside.
b. **Size:** 16 inches (406 mm) long by 6 inches (152 mm) deep.
c. **Material and Finish:** Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel, No. 4 finish (satin).

2. **Mop and Broom Holder:**

a. **Description:** Unit with shelf, hooks, holders, and rod suspended beneath shelf.
b. **Length:** 36 inches (914 mm).
c. **Hooks:** Three.
d. **Mop/Broom Holders:** Four, spring-loaded, rubber hat, cam type.
e. **Material and Finish:** Stainless steel, No. 4 finish (satin).
f. **Shelf:** Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel.
g. **Rod:** Approximately 1/4-inch- (6-mm-) diameter stainless steel.

3. **Paper Towel (Roll) Dispenser:**

a. **Description:** Lever-actuated mechanism permits controlled delivery of paper rolls in preset lengths per stroke.
b. **Mounting:** Surface mounted.
c. **Minimum Capacity:** 8-inch (203-mm) wide, 800-foot (244-m) long roll.

d. **Material and Finish:** Stainless steel, No. 4 finish (satin).
e. **Lockset:** Tumbler type.

4. **Liquid-Soap Dispenser:**

a. **Description:** Designed for dispensing soap in liquid or lotion form.
b. **Mounting:** Vertically oriented, surface mounted.
c. **Capacity:** 45 oz.
d. **Materials:** Exposed portions stainless steel No. 4 finish (satin), reservoir materials ABS or polypropylene.
e. **Refill Indicator:** Window type.

F. **Fabrication:** Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

1. **Keys:** Provide universal keys for internal access to accessories for servicing and re-supplying. Provide minimum of six keys to AOC's representative.

PART 3 - EXECUTION

3.1 TOILET COMPARTMENTS

A. **General:** Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. **Maximum Clearances:**

a. Pilasters and Panels: 1/2 inch (13 mm).
b. Panels and Walls: 1 inch (25 mm).

2. **Stirrup Brackets:** Secure panels to walls and to pilasters with not less than three brackets attached at midpoint and near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

B. **Installation:** Install ceiling hung compartments for all new work and where replacement of existing ceiling systems permits installation of miscellaneous metal supporting systems. For installations approved for “replacement-in-kind” compartments, provide the appropriate compartment listed below:

1. **Overhead-Braced Units:** Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than two fasteners. Hang

doors to align tops of doors with tops of panels and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

2. **Floor-Anchored Units:** Set pilasters with anchors penetrating not less than 2 inches (50 mm) into structural floor, unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.
3. **Ceiling-Hung Units:** Secure pilasters to supporting structure and level, plumb, and tighten. Hang doors and adjust so bottoms of doors are level with bottoms of pilasters when doors are in closed position.
4. **Wall-Hung Urinal Screens:** Attach with anchoring devices to suit supporting structure. Set units level and plumb and to resist lateral impact.

C. **Hardware Adjustment:** Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and doors in entrance screens to return doors to fully closed position.

3.2 TOILET, BATH, AND LAUNDRY ACCESSORIES

A. **Installation:**

1. **Install accessories** according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
2. **Grab Bars:** Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

B. **Adjusting and Cleaning:**

1. **Adjust accessories** for unencumbered, smooth operation. Replace damaged or defective items.
2. **Remove temporary** labels and protective coatings.
3. **Clean and polish** exposed surfaces according to manufacturer's written recommendations.

END OF DIVISION TEN

DIVISION TWENTY-ONE: WATER-BASED FIRE SUPPRESSION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. **Scope:** This work includes designing and providing a new, or modifying an existing complete, automatic sprinkler system as described herein. The system shall include all piping, sprinklers, fittings, hangers, valves, flow switches, tamper switches, check valves, riser trim package(s), back-flow preventers, air compressors, drains, inspector's test connections, fire department connections, and all other accessories and miscellaneous items required for a complete operating system even though each item is not specifically mentioned or described. The new sprinkler system shall be tested and ready for full operation prior to acceptance by the Government.

B. **Extent of the Work:** The system shall be installed as described and in accordance with the referenced publications. Any conflicts between these documents shall be brought to the attention of the design professional responsible for the job, the project manager, and the AOC fire protection engineer.

C. **Existing Sprinkler System Equipment:** Existing sprinkler system and all associated equipment shall be maintained fully operational until the new equipment has been tested and accepted by the Government.

D. **Equipment Removal:** After acceptance of the new system by the Government, all existing equipment so indicated shall be removed and all damaged surfaces shall be restored as herein specified.

E. **Compliance:** The entire automatic sprinkler system shall be designed in accordance with Section 1.4 A. Any reference to "authority having jurisdiction" shall be interpreted to mean the AOC Fire Marshal. All material and equipment used shall be listed or approved by UL, FM or another nationally recognized testing agency approved by the Contracting Officer, for their intended use and service.

F. **Related Sections and Divisions:**

1. **Division** 1 specifications for the following:

   a. Health & Safety
   b. Cutting & Patching

2. **Division 2** specifications for the following:

   a. Asbestos Abatement Procedures
   b. Lead Abatement

c. Lead Control

3. **Refer to this Division 7** specification for Fire stopping.

4. **Refer to this Division 9** specification for Painting.
5. **Refer to these Division 22** specification for the following:

a. Supports and Anchors
b. Mechanical Requirements

6. **Refer to these Division 26** specification for the following:

a. Power Wiring
b. Fire Alarm and Detection Systems

1.2 QUALITY ASSURANCE

A. **General:** Provide design, materials and devices for an automatic sprinkler system, complete, conforming to National Fire Protection Association (NFPA) Standard 13, 2002 edition, except as otherwise or additionally specified herein.

B. **Designer and Installer Requirements:** All sprinkler system design, including shop drawings, shall be by a NICET Level III or IV Sprinkler Technician or a Registered Fire Protection Engineer. Installation shall be performed by a certified sprinkler contractor or a specialist who is experienced in the design and installation of automatic sprinkler systems (minimum 3 years). A NICET Level II or higher Sprinkler Technician shall supervise installation. A sprinkler contractor whose business is located within a 75 miles radius of the U.S. Capitol and whose business has been operated and established within this radius for at least three (3) years shall perform design and installation. The CO/COTR may reject any proposed installer who cannot show evidence of such qualifications.

C. **Submittals:** The Contractor shall submit the following at time of proposed submission for verification of qualifications: Submit documentation, to the CO/COTR, showing that the Contractor has successfully installed automatic fire suppression sprinkler systems of comparable size, type and design as specified herein or that the Contractor has a firm contractual agreement with a Subcontractor having such experience. If the work will be performed by a Subcontractor, the Contractor shall submit a copy of the subcontract to the CO/COTR. The data shall include the names and locations of at least five installations where the Contractor, or if the work will be performed by a Subcontractor, the Subcontractor, installed such systems. The Contractor, or Subcontractor, shall certify that each system has performed satisfactorily for a period of not less than one year.

D. **Project Superintendent:** The Contractor, or Subcontractor, shall provide one full-time, on-site staff member designated as the "Project Superintendent". The duties of the Project Superintendent are to supervise execution of all aspects of this specification, including safety on the job site as described in the "Accident Prevention Clause" of the general provisions of the Occupational Safety and Health (OSH) Act of 1970. That clause incorporates into the

contract, by reference, the Secretary of Labor's OSH Standards (29 CFR Part 1926). Refer to Safety & Health for additional requirements. The Project Superintendent shall be thoroughly familiar with all contract obligations and shall have authority to make all contractual decisions within the scope of the contract. The Project Superintendent shall be responsible for making sure that quality control review has been performed on all submittals prior to the submission to the CO/COTR. The Project Superintendent shall also be responsible for ensuring that all submittals are accurate and fully coordinated.

E. **Service Organization:** The Contractor shall furnish, to the CO/COTR, evidence that there is an experienced and effective service organization that carries a stock of repair parts for the system in order to readily effect repairs throughout the warranty period. Should the Contractor fail to comply with the service requirements of this section, the Government may make the necessary repairs and back charge the Contractor without any loss of warranty or guarantee as provided by the contract documents.

F. **Warranty and Guarantees:** The Contractor shall guarantee labor, materials and equipment provided under this contract against defects for a period of one year after the date of final acceptance of this work by the Government. Final Acceptance includes, but is not limited to, successful final acceptance testing, the receipt of as-built drawings, and operation and maintenance manuals.

G. **Codes and Standards:** Provide a sprinkler system conforming to the following editions of the following codes and standards:

1. **National Fire Protection Association** (NFPA), including all amendments:

   a. NFPA 13 Standard for the Installation of Sprinkler Systems (2002).
   b. NFPA 14 Standpipe and Hose Systems (2003).
   c. NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection (1999).
   d. NFPA 24 Standard for the Installations of Private Fire Service Mains (2002).
   e. NFPA 70 National Electrical Code (2002).
   f. NFPA 1963 Standard for Screw Threads and Gaskets for Fire Hose Connection (1998).

2. **American Water Works Association** (AWWA): AWWA C651 (Addendum 1990) Disinfecting Water Mains).
3. **Factory Mutual Engineering and Research Corporation** (FM): FM-P7825 Approval Guide.
4. **Underwriters Laboratories Inc.** (UL): UL-FPED Fire Protection Equipment Directory.
5. **International Code Council** (ICC): International Building Code (2003)

1.3 EQUIVALENT TECHNOLOGIES

A. **Nothing in this specification** is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed in this specification. Technical documentation shall be submitted to the AOC Fire Marshal to determine equivalency. The system, method, or device shall be approved for the intended purpose by the AOC Fire Marshal prior to being utilized.

1.4 SYSTEM DESIGN

A. **General:** Design automatic sprinkler systems in accordance with NFPA 13, except where modified herein, by hydraulic calculations when ten or more sprinklers are added to an existing system, a new system, or extended coverage sprinklers are used. Pipe schedule may be used when 1 or more but less than 10 sprinklers are added to an existing system. Each system shall be designed using the area/density design approach as defined by NFPA 13. The minimum Hazard Occupancy is Ordinary Hazard Group II, unless a higher occupancy hazard is required by another code or standard. Uniform water distribution over the design area must be accomplished. Each system shall include materials, accessories, and equipment, inside and outside the building, so that the system is complete and ready for use. Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts and other construction and equipment in accordance with detailed working drawings to be submitted for approval. Design system to avoid use of pressure reducing valves (PRVs) through use of increased pipe sizes, looped branch lines, and/or multiple risers.

1. **Location of Sprinklers:** The spacing of sprinklers shall not exceed that permitted by NFPA 13 for Ordinary Hazard Group II. Where practical, uniformly space sprinklers on the branch piping. Locate sprinklers in a pattern consistent with ceiling grid (center of tile), lights, and air supply diffusers.
2. **Water Distribution:** Distribution shall be uniform throughout the area in which the sprinklers will operate. Discharge from individual sprinklers in the hydraulically most remote area shall be at least 100 percent of the specified density.
3. **Density of Application of Water:** Application to horizontal surfaces below the sprinklers shall be a minimum 0.20 gpm per sq. ft. Sprinkler piping shall be sized to provide the specified density when the system is discharging the total maximum required flow.
4. **Sprinkler Discharge Area:** The discharge area shall be the hydraulically most remote 1500 sq. ft.. The sprinkler discharge area shall not be reduced by exceptions in NFPA 13. Dry-pipe systems must be increased per the requirements of NFPA 13.
5. **Total Combined Inside & Outside Hose Allowances:** Hydraulic calculations shall include an allowance of 250 gpm for hose streams, added at the point of connection to the water supply.
6. **Friction Loss:** Calculate the friction loss in piping in accordance with the Hazen-Williams formula using 'C' values found in NFPA 13.

7. **Water Supply:** When flow test results are available, base hydraulic calculations on the pressure at the junction with the water distribution piping system or the hydraulic calculations can be taken back to the fire pump discharge. The fire pump test results can be obtained from the Jurisdictional fire protection engineer.
8. **Air Supply:**

   a. *Design the automatic*, dry- pipe sprinkler system and specify the appropriate dry-pipe valve so that air pressure on the system does not exceed 30 psi inclusive of safety factor. If a high-pressure water supply is provided for the automatic, dry-pipe sprinkler system, the designer shall document the measured water supply flow test (Refer to Section 1.4.A.7) and the necessity for maintaining air pressures in excess of 30 psi. That documentation shall be submitted for approval to the AOC. No work is to be done or equipment to be ordered for a system designed in excess of 30 psi air pressure without approvals from the AOC.
   b. *Provide* a listed air compressor sized to meet the fill requirements of NFPA 13.
   c. *Provide* a listed air maintenance device so that air pressure is maintained automatically on the system.

1.5 SUBMITTALS

A. **Division-1:** Conform to the requirements of Division-1, Section "SUBMITTALS." Submit 6 complete sets of submittals. Partial submittals are not acceptable and will be returned without review. Before any work is commenced, the AOC Fire Marshal must approve the submittal. Manufacturer's data shall be provided for the following and annotated to show the specific model, type and size of each item:

1. Check valves
2. Sprinkler(s), cabinet, escutcheons and guards
3. Fire department connections, with signage and caps
4. Pressure and water flow detectors
5. Dry-pipe valves and trim package
6. Inspector's test valves
7. Drain valves
8. Alarm valves
9. All Control Valves including gate, butterfly, and globe
10. Pipe, fittings, hangers, supports, and mechanical couplings
11. Air compressor
12. Tamper switches
13. Sprinkler system signage
14. All wiring
15. Back flow preventers, double detector check and/or rpz assemblies
16. Pressure gages
17. Low and High air pressure switches
18. Quick Opening Devices
19. Fire hose valves.
20. All other associated equipment

B. **Test Certification and Instruction:** Submit test certification, to the CO/COTR, for all pipe and fittings.

C. **Shop Drawings:** Submit detailed shop drawings, in accordance with NFPA 13, "Working Plans", on uniform size sheets no smaller than 30 inches by 42 inches, to the CO/COTR for review and approval. Information shall include, but not be limited to the following:

1. **Layout** indicating details, plan view, elevations and sections of the system piping. Indicate the location of sprinklers and piping in relation to the ceiling layout, showing pipe lengths and sizes.
2. **Detailed riser diagram** showing schematic of systems supply, supply connection, devices, valves, pipe and fittings.
3. **Point-to-point** electrical wiring diagrams for all alarm and supervisory devices.
4. **The signature and seal** of a registered Professional Fire Protection Engineer, or the signature and certification number of a NICET Level III or IV Sprinkler Technician.
5. **Hydraulic calculations** in accordance with the following:

    a. Minimum operating pressure of any sprinkler shall be according to NFPA 13 and the appropriate laboratory listing.
    b. Pipe friction loss shall be calculated for all piping.
    c. Flows shall be calculated to the nearest whole gallon.
    d. Velocity pressures may be neglected.
    e. A 10 psi safety factor is required for all hydraulic calculations.
    f. Submit name of hydraulic program, if used.

6. **Current Water Supply Information:** Where applicable, this information shall reflect water flow available at the fire pump discharge.
7. **Calculations** for dry-pipe sprinkler system fill times shall be provided.

1.6 AS-BUILT DRAWINGS

A. **General:** Prepare and submit to the Contracting Officer 6 sets of detailed "As-Built Drawings". The drawings shall show the system as installed including all deviations from both the project drawings and the approved shop drawings. The drawings shall also include all information as required by NFPA 13. The drawings shall be prepared on uniform sized sheets not less than 30 inches by 42 inches. Submit these drawings within two weeks after the final acceptance of the system. Prepare computer-aided design drawings in conformance with Division One.

1.7 OPERATION AND MAINTENANCE MANUALS

A. **General:** Not less than 7 calendar days prior to the final acceptance testing of the entire system, and for use during the instruction period hereinafter specified, provide 6 bound copies of an Operation and Maintenance Manual to the CO/COTR. The manual shall include an index, copies of all approved shop drawings and all submittal materials (updated to as-built), and a complete parts list of all components. The manual shall also include, for each item, the

manufacturer's name, the serial number of the part, an ordering number, if appropriate, and a physical description of the part.

PART 2 - PRODUCTS

2.1 ABOVEGROUND PIPING SYSTEMS

A. **General:**

1. Provide piping, valves, and fittings, approved for 175 psi working pressure, in accordance with NFPA 13, as indicated on the drawings and as specified herein.
2. **Conceal all piping** in areas with suspended ceilings. Leave piping exposed in areas without ceilings.
3. **Provide fittings** for changes in direction of piping and for connections. Make changes in piping through tapered reducing pipe fittings; bushings will not be permitted.
4. **Black steel piping** and/or copper tubing shall be used for wet-pipe systems and galvanized (internal and external) piping shall be used for dry-pipe systems.
5. **Steel pipe sizes 2 inches** and smaller shall be Schedule 40 and shall be threaded.
6. **Steel pipe sizes larger than 2 inches** shall be a minimum Schedule 10. Piping less than Schedule 40 shall be roll-grooved.
7. **Threadable** lightweight pipe shall not be used.
8. **Piping** having a corrosion ratio of less than 1 shall not be used.
9. **Side outlet tees** using rubber gasketed fittings shall not be permitted.
10. **All sprinkler piping** shall be so installed that it can be thoroughly drained, and, where practical, shall be arranged to drain at the main system riser drain.
11. **Preaction** sprinkler systems shall not be installed.
12. **Antifreeze** sprinkler systems shall not be installed.
13. **In areas subject to freezing**, install dry-pipe sprinkler systems, dry pendent sprinklers, or provide heat in the space, and/or reroute the sprinkler piping to avoid freezing. Heat tape shall not be used on sprinkler piping.

B. **Fittings:** Fittings, mechanical couplings and rubber gaskets shall be supplied by the same manufacturer. Fittings into which sprinklers, sprinkler riser nipples, or drop nipples are threaded shall be welded, threaded, or grooved-end type. Plain-end fittings will not be permitted.

C. **Control Valves:** Provide valves in accordance with NFPA 13, and as follows:

1. **Riser and sectional control valves** shall be butterfly or OS&Y type. Control valves on piping larger than 4 inches shall be of the OS&Y type. Control valves on piping 4 inches and under may be OS&Y or butterfly type. Floor control valves shall be located in the stairwells, whenever possible. A minimum of 7.5 feet of headroom shall be maintained in the stairwells.

a. *Butterfly Type:* Valve shall have an integral tamper switch. Valve position shall be clearly identifiable from a distance of 10 feet after installation and without the need of special equipment (e.g. equipped with integral pointer).
b. *OS&Y Type:* Shall be iron body and brass mounted and open by counterclockwise rotation. Each interior control valve shall be provided with adequate means for mounting a tamper switch.

2. **Drainage and test valves** shall be all bronze globe, angle or gate valves.
3. **Provide control valves**, water flow switch and a test/drain assembly in piping to sprinklers protecting elevator machine rooms, electrical switchgear rooms, transformer vaults, and essential electronic facilities. Valves shall be located outside the room in an accessible location. Provide tamper switches on all such valves.
4. **All control valves** shall be labeled so as to indicate the area/zone that is serviced by that valve. Signage shall be compliant with all required and advisory provisions of NFPA 13.

D. **Check Valves:** All check valves shall be clear opening swing-check type.

1. **2 inches** and smaller check valves shall be all bronze with screw ends.
2. **2-1/2 inches** and larger check valves shall be either iron body, brass mounted with flanged ends, access plate, with non-ferrous metal set rings and bearings or groove-lock type.

E. **Pipe and Hanger Supports:** Provide pipe supports, sway braces, hangers, and clamps in accordance with NFPA 13.

F. **Identification Signs:** Attach properly lettered and approved metal signs as described in NFPA 13 to each control valve, alarm device, inspector's test valve, drain valve, and alarm bypass valve. Each sign shall indicate the normal valve position as well as the portion of the system that the valve serves. Permanently affix hydraulic design data nameplates to the riser of each system.

G. **Drain Assemblies:** Provide all drain lines as required by NFPA 13. Connect all drain piping to approved drain locations and provide splashguards, where necessary, at discharge outlets. All drains shall be capable of full flow without creating water damage or safety hazards.

1. **The main drain valve** shall discharge outside the building or to sight cones attached to drains of adequate size to readily receive the full flow from each drain under maximum pressure.
2. **All drain discharge outlets** on the outside of the building shall be located no higher than 1 foot above grade level. Exterior drain discharge shall not cause water damage to the building, landscape damage, or create safety hazards from water runoff or freezing.
3. **Drains provided** as part of floor control valves shall discharge to an express drain located adjacent to the sprinkler riser. These drains shall be of the combination inspector's test/drain type. Express drains shall terminate in a location that accepts full flow under working pressures without water damage or creating safety hazards.

H. **Inspector's Test Connection:** Install test valves conveniently accessible within 6 feet 8 inches of the floor. An Inspector's Test Connection, located at the floor/sectional control valve, shall be provided to test each water flow device for wet-pipe systems and at the most remote point for dry-pipe systems. The test connection shall discharge to a drain assembly or an approved outside location where the discharge can be observed and water damage will not occur. Inspector's Test Connections shall terminate in a location that accepts full flow under working pressures without water damage or creating safety hazards.

2.2 UNDERGROUND PIPING SYSTEMS

A. **General:** Provide outside-coated, ductile-iron, cement-mortar lined pipe and fittings conforming to NFPA 24. Anchor joints in accordance with NFPA 24. Provide concrete thrust block or other suitable means of thrust restraint in accordance with NFPA 24. Restrain the pipe riser with steel rods from the elbow where the pipe turns up toward the floor, to the flange above the floor. Minimum pipe size shall be 6 inches. Minimum depth of cover shall be such that the top of the pipe is not less than 1 foot below the frost line or 36 inches below finished grade, whichever is greater.

B. **Gate Valves:** Shall be opened by counterclockwise rotation.

C. **Post Indicator Valves:** Post indicator valves are not permitted for use on the Capitol complex.

D. **Valve Boxes:** Except where indicator posts are provided, for each buried valve, provide cast-iron, ductile-iron, or plastic valve box of a suitable size. Plastic boxes shall be constructed of acrylonitrile butadiene styrene (ABS) or inorganic fiber-reinforced black polyolefin. Provide cast-iron, ductile-iron or plastic cover for valve box with the word WATER cast on the cover. The minimum box shaft diameter shall be 6 inches. Coat cast-iron and ductile-iron boxes with bituminous paint applied to a minimum dry-film thickness of 10 mils.

E. **Buried Utility Warning and Identification Tape:** Provide detectable aluminum foil plastic-backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of buried piping. Tape shall be detectable by an electronic detection instrument. Provide tape in rolls 3 inches minimum width, color coded for the utility involved with warning and identification imprinted in bold black lettering continuously and repeatedly over the entire tape length. Warning and identification shall be: CAUTION BURIED WATER PIPING BELOW or similar. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material. Bury tape with the printed side up at a depth of 1 foot below the top surface of the earth or the top surface of the sub-grade under pavements.

2.3 SPRINKLERS

A. **General:** Sprinklers shall be in conformance with NFPA 13. Applications of type and style of sprinklers to protection of the specified facilities shall be approved by the AOC Fire Marshal.

B. **Types:** Provide quick response automatic sprinklers throughout, except in elevator machine rooms. Extended coverage sprinklers must be approved by the AOC Fire Marshal. All sprinklers must be UL listed. Sprinklers with "O-ring" seals are not permitted. Sprinklers located within the air streams of unit heaters or other heat emitting equipment or skylights shall be selected for proper temperature rating.

C. **Corrosion and Mechanical Protection:** Provide corrosion-resistant sprinklers where they are exposed to weather, moisture or corrosive vapors. Protect sprinklers installed where they might receive mechanical injury/damage, are less than 6 feet 8 inches above the floor level, or are located in electrical rooms or closets, with approved guards in accordance with NFPA 13.

D. **Suspended Ceilings:** Provide concealed pendent sprinklers, with pipe and fittings located above the suspended ceiling, whenever possible. In areas without concealed sprinklers replace the existing sprinklers with sprinklers of similar finish.

E. **Spare Sprinklers:** Provide a minimum of one approved metal cabinet containing a stock of spare sprinklers of all types and ratings installed as well as any special tools required for removal or replacement of the sprinklers. The number of spare sprinklers shall conform to NFPA 13. The cabinet shall be located, in an area where the temperature will not exceed 100 degrees F., and approved by the AOC.

2.4 WATERFLOW DETECTORS

A. **General:** Provide a vane type water flow detector to replace each existing water flow detector or as required for new systems. The device shall contain double pole, double throw contacts. Equip the detector with a pneumatic time delay, field adjustable from zero to ninety seconds. The time delay shall be set initially to 30 seconds for zone/floor water flow detectors and 45 seconds for riser or main water flow detectors. Water flow switches used for shunt tripping of elevator machine room power shall not be equipped with a time delay feature. The device shall be a UL listed Extinguishing System Attachment rated for the particular pressure and location at which it is installed. Water flow detectors shall be equipped with screw terminals for each conductor. Connection to the fire alarm system shall be as specified.

2.5 TAMPER SWITCH

A. **General:** Provide a tamper switch for each sprinkler system control valve, including outside post indicating valves. Tamper switches shall have double pole, double throw contacts with screw terminals for each conductor. Operation of the switch shall cause a supervisory signal to be transmitted to the FACP upon not more than two complete turns of the valve wheel or a closure of twenty percent, whichever is less. Connection of this device to the fire alarm system shall be as specified.

2.6 LOW / HIGH AIR PRESSURE SUPERVISORY SWITCH

A. **General:** Provide high and low air pressure supervision for each dry pipe sprinkler system. Switch shall be connected to the fire alarm system so that it gives a visual and audible alarm when air pressure in the system drops halfway from the normal pressure to the tripping point and when air pressure in the system rises 10 psi above the normal pressure. Device shall be connected as specified in the fire alarm specification.

2.7 FIRE DEPARTMENT CONNECTION

A. **General:** Provide a fire department Siamese connection(s) in accordance with NFPA 13. Locate the fire department connection at a location that is readily accessible to the fire department.

B. **Material:** Siamese finish shall be approved by the AOC, with breakaway inlet plugs or chains and caps to match.

C. **Clapper Valve:** Provide self-closing clapper valve in each inlet.

D. **Mounting Type:** Siamese shall be approved by the AOC. Provide the escutcheon with a finish to match the body of the Siamese connection(s). In buildings where multiple Fire Department Connections are used to supply different, non-connected systems within the building, each connection shall be clearly and permanently labeled as to indicate the portion of the building that it serves.

E. **Hose Threads:** Provide threads that are local fire department inlet thread type.

F. **Install fire department** connection between 3 feet and 4 feet above grade level.

G. **Ball drip** shall be installed and arranged to discharge directly to the outside of building on to a splash block in such a means as to divert water away from the building.

2.8 ESCUTCHEON PLATES

A. **General:** Provide escutcheons for pipes passing through walls, partitions, or suspended-type ceiling to provide a finished appearance to the installation. Escutcheon plates shall not interfere with or inhibit the performance of required fire-stopping around the sprinkler piping. Escutcheon finish shall be approved by the AOC.

2.9 PIPE SLEEVES

A. **General:** Provide pipe sleeves where piping passes entirely through walls, floors and partitions. Secure sleeves in position during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, floors and roofs. Provide 1 inch minimum clearance between exterior of piping and interior of sleeve or core-drilled hole. Where noise attenuation is required, pack the space with mineral wool or other flame resistant insulation and seal space

at both ends of the sleeve or core-drilled hole with plastic waterproof cement that will dry to a firm but pliable mass, or provide a mechanically adjustable segmented elastomeric material. Penetrations of fire-rated wall and floor assemblies shall be sealed with a listed fire-stopping materials.

1. **Sleeves in Masonry and Concrete Walls, Floors, and Roofs:** Provide hot-dip galvanized steel, ductile-iron, or cast-iron sleeves. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled hole are completely grouted smooth.
2. **Sleeves in Other Than Masonry and Concrete Walls, Floors, and Roofs:** Provide 26 gauge galvanized sheet steel.

2.10 STANDPIPE OUTLETS

A. **General:** Provide bronze hose valves that are gate or angle-type with screw-in bonnets with one 2-1/2 inch threaded outlet with a 1-1/2 inch reducer and cap with chain. Provide threads that are local fire department thread.

2.11 DRY PIPE VALVES

A. **General:** Provide dry pipe valves, with all trimming as required for a standard unit, that are UL listed or FM approved. Provision shall be made to prevent excessive water columning. The dry pipe valve shall be fitted with an alarm bypass test connection so the water flow device may be tested without opening the dry pipe valve.

B. **Quick-Opening Devices:** Provide an approved quick-opening device for dry pipe valves controlling systems having capacity of more than 500 Gallons. Quick Opening Devices shall be Electronic Accelerators. Mechanical accelerators are to be avoided. Quick opening devices may be deleted if a UL approved water delivery computer program utilized in conformance with NFPA 13 determines that water delivery will occur within the time parameters of NFPA 13.

2.12 AUTOMATIC AIR COMPRESSOR

A. **General:** Provide an automatic air compressor with tank capable of maintaining the required operating pressure on the automatic dry pipe sprinkler system and capable of full recovery within 30 minutes (60 minutes for low differential type dry system). Provide all pressure switches, flow switches, supervisory switches and low/high air pressure switches in accordance with NFPA and the manufacturer's recommendations. Assure that air pressure maintenance is performed automatically with supervision integrated with the building fire alarm system to identify operational anomalies.

PART 3 - EXECUTION

3.1 INSTALLATION

A. **General:** Installation, workmanship, fabrication, assembly, erection, examination, inspection and testing shall be in accordance with NFPA 13 latest edition, except as modified herein. Install sprinkler piping straight and true, to bear evenly on hangers and supports. Sprinkler piping shall be hung from structural elements capable of bearing the full designed load and in full compliance with all referenced codes. No other load shall be suspended from sprinkler piping or sprinkler piping hangers/supports. Do not hang piping from plaster ceilings. Keep the interior and ends of new piping and existing piping affected by Contractor's operation thoroughly cleaned of water and foreign material. Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign material. Inspect piping before placing into position.

B. **Install valves** as shown on the drawings and as recommended by the manufacturer. Lubricate valves and exercise them after installation and prior to testing to assure proper operation, travel, and ease of use. Valves that hang up during operator travel, are stiff and difficult to use, require the use of a wrench or other tool to force the operator to move, or that do not close completely shall be replaced with a new and unused valve.

C. **Field Changes:** Field changes shall not be made in the piping layout or pipe sizes without the prior approval of the CO/COTR.

D. **Freeze Protection:** Protect wet-pipe sprinkler system piping subject to temperatures lower than 40 degrees F. against freezing in accordance with NFPA 13.

E. **Welding:** Perform all welding in the shop. Any field welding must be approved by the CO/COTR. After he/she receives approval, the AOC will evaluate the exposure created by the proposed operations and review procedures related thereto for the prevention of fires in accordance with NFPA 51B Standard for Fire Prevention During Welding, Cutting, and Other Hot Work.

F. **Painting:** Painting shall meet the requirements of the Painting and Finishing specification. In addition, exposed threads of all ferrous pipe shall be given one coat of corrosion-resistant paint at the time of installation. All sprinkler piping and other metal that is exposed in unfinished areas, except sprinklers, bronze, chrome or brass fittings, and moving parts shall be painted red. All piping and other metal that is exposed in finished areas, except sprinklers, bronze, chrome or brass fittings, and moving parts shall be painted to match background colors. Risers and other sprinkler piping in stairwells shall be painted to match background colors. Concealed sprinkler piping shall have 4 inch wide red painted bands placed no more than 10 feet on center and on each side of wall penetrations.

3.2 FIRESTOPPING

A. **General:** Firestop all holes for conduit, piping, or other penetrations which pass through floor slabs, fire-rated walls, partitions with fire-rated doors, vertical service shafts, or any fire-rated assemblies in accordance with the specifications.

3.3 TESTING

A. **Preliminary Testing:** Hydrostatically test wet-pipe sprinkler system, and conduct hydrostatic and air test of dry-pipe system as required by NFPA 13. Hydrostatically test the underground piping in accordance with NFPA 24. All tests must be in the presence of the CO/COTR or his designated representative. The Contractor and an authorized representative from each supplier of equipment shall be in attendance at the preliminary test. Test alarms, tamper switches, and all other devices for smooth and correct operation. Test the water flow alarms by flowing water through the inspector's test connection. When tests are completed and corrections made, submit a signed and dated material and test certificate compliant with that specified in NFPA 13, with a request for formal inspection and tests.

B. **Final Inspection and Testing:** Notify the CO/COTR in writing when hydrostatic and alarm tests have been completed and all necessary corrections made, so as to permit final inspection and testing. Submit request for testing at least 15 calendar days prior to test date. A final acceptance test will not be scheduled until the O&M Manuals are provided to and approved by the CO/COTR and the following are provided at the job site:

1. **At the final test**, provide a material and test certificate in accord with NFPA 13.
2. **Submit** up-to-date redlined shop drawings to the CO/COTR at the final test. These drawings shall be undamaged sets of prints of the shop drawings, with changes from the original drawings marked in red.
3. **A member of the AOC Fire Marshal's Office** shall witness the final tests. At this time, any and all required tests shall be repeated at the discretion of the Government. Should the sprinkler system or any of its components or interfaces thereto not operate as required, the AOC Fire Marshal representative may cancel the final test and require the final test to be repeated when deficiencies are resolved to the satisfaction of the AOC Fire Marshal. Any such repeated tests as required by the Government shall be done at no additional expense to the Government. The Contractor and authorized representative from each supplier of equipment shall be in attendance at the final test.
4. **Final testing** shall include, but is not limited to, full flow testing through both the main drain and the inspector's test connection(s), testing of all water flow and tamper switches, testing of all valves, testing of all fire hose valves, and observation of all fire department connections and fire pump test headers.
5. **The Contractor** shall provide all personnel, equipment, tools, gauges, meters, ladders, and communication devices necessary for the performance of all tests. Government representatives are present to observe the testing and will not bring any equipment to perform testing. The Contractor shall provide communications devices for Government representatives observing the testing so that they may communicate with the members of the testing team.

3.4 COORDINATION OF WORK

A. **Disruptions** to existing automatic sprinkler systems shall be kept to a minimum or avoided.

B. **Delineate phasing** of construction to ensure that installations of new systems are expedited, and existing systems are kept in service until the replacement system is operational.

C. **If fire protection systems** are to be disrupted, procedures shall be incorporated into the design and execution to maintain equivalent levels of fire protection and provide formal notification to the facility while systems are down. The determination of equivalency shall rest with the AOC Fire Marshal.

END OF DIVISION TWENTY-ONE

DIVISION TWENTY-TWO - PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes the following mechanical system piping and equipment:

1. Steel pipe hangers and supports.
2. Ball Valves
3. Domestic water piping.
4. Sanitary waste piping.
5. Storm drainage.
6. Commercial plumbing fixtures: Faucets for lavatories, showers and sinks; flushometers; toilet seats; fixture supports; interceptors; shower receptors; water closets; urinals; lavatories; commercial sinks; service sinks; and service basins.

1.3 DEFINITIONS

A. **MSS:** Manufacturers Standardization Society for The Valve and Fittings Industry Inc.

B. **Terminology:** As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

C. **Valves:** The following are standard abbreviations for valves:

1. **CWP:** Cold working pressure.
2. **EPDM:** Ethylene-propylene-diene terpolymer rubber.
3. **NBR:** Acrylonitrile-butadiene rubber.
4. **PTFE:** Polytetrafluoroethylene plastic.
5. **SWP:** Steam working pressure.
6. **TFE:** Tetrafluoroethylene plastic.

D. **LLDPE:** Linear, low-density polyethylene plastic.

E. **PE:** Polyethylene plastic.

1.4 PERFORMANCE REQUIREMENTS

A. **Design supports** for multiple pipes, including pipe stands, capable of supporting combined

weight of supported systems, system contents, and test water, plus a 50 percent safety factor.

B. **Design equipment supports** capable of supporting combined operating weight of supported equipment and connected systems and components, plus a 50 percent safety factor.

C. **Provide components** and installation of domestic water piping systems with a minimum working-pressure rating of 125 psig (860 kPa), unless otherwise indicated.

D. **Components and installation** shall be capable of withstanding the following minimum working-pressure, unless otherwise indicated:

1. **Solid, Waste, and Vent Piping:** 10-foot head of water (30 kPa).
2. **Storm Drainage Piping:** 10-foot head of water (30 kPa).
3. **Storm Drainage, Force-Main Piping:** 100 psig (690 kPa).

1.5 SUBMITTALS

A. **Product Data:** For the following:

1. **Steel pipe** hangers and supports.
2. **Ball Valves:** For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.
3. **Each type of** pipe, tube, fittings, and couplings.
4. **Each type of** electric-powered plumbing fixture.

B. **Shop Drawings:** Show fabrication and installation details and include calculations by a qualified professional engineer.

C. **Water Samples:** Specified in Part 3 "Cleaning and Disinfecting" Article.

1.6 REFERENCED STANDARDS

A. **American Welding Society:**

1. **AWS D1.1:** Structural Welding Code - Steel

B. **American Society for Testing and Materials:**

1. **ASTM A 47/A 47M:** Ferritic Malleable Iron Castings
2. **ASTM A 53/A 53M:** Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
3. **ASTM A 74:** Specification for Cast Iron Soil Pipe and Fittings
4. **ASTM A 106:** Seamless Carbon Steel Pipe for High-Temperature Service

5. **ASTM A 536:** Specification for Ductile Iron Castings
6. **ASTM A 733:** Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
7. **ASTM B 32:** Solder Metal
8. **ASTM B 75:** Seamless Copper Tube
9. **ASTM B 75M:** Seamless Copper Tube [Metric].
10. **ASTM B 88:** Seamless Copper Water Tube.
11. **ASTM A 88M:** Seamless Copper Water Tube [Metric].
12. **ASTM B 584:** Copper Alloy Sand Castings for General Applications.
13. **ASTM B 813:** Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.
14. **ASTM B 828:** Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.
15. **ASTM F 2014:** Specification for Non-Reinforced Extruded Tee Connections for Piping Applications.

C. **ASME International:**

1. **ASME A112.18/19:** Fixtures (various, as applicable).
2. **ASME B16.1:** Cast Iron Pipe Flanges and Flanged Fittings.
3. **ASME B16.4:** Gray Iron Threaded Fittings.
4. **ASME B16.12:**Cast Iron Threaded Drainage Fittings.
5. **ASME B16.18:** Cast Copper Alloy Solder Joint Pressure Fittings.
6. **ASME B16.22:** Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
7. **ASME B16.23:** Cast Copper Alloy Solder Joint Drainage Fittings (DWV).
8. **ASME B16.24:** Cast Copper Alloy Pipe Flanges, Class 150, 300, 400, 600, 900, 1500, and 2500, and Flanged Fittings, Class 150 and 300.
9. **ASME B16.29:** Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
10. **ASME B16.34:** Valves - Flanges, Threaded, and Welding End.
11. **ASME B16.39:** Malleable Iron Threaded Pipe Unions - Classes 150, 250, and 300.

D. **Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.:**

1. **MSS SP-69:** Pipe Hangers and Supports - Selection and Application.
2. **MSS SP-89:** Pipe Hangers and Supports - Fabrication and Installation Practices.
3. **MSS SP-123:** Non-Ferrous Threaded and Solder-Joint Unions for Use with Copper Water Tube.

E. **American Water Works Association:**

1. **AWWA C105:** Polyethylene Encasement for Ductile-Iron Pipe Systems.
2. **AWWA C111:** Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
3. **AWWA C151:** Ductile-Iron Pipe Centrifugally Cast, for Water.
4. **AWWA C153:** Ductile-Iron Compact Fittings for Water Service.
5. **AWWA C219:** Bolted, Sleeve-Type Couplings for Plain-End Pipe.

F. **SSPC: The Society for Protective Coatings:**

1. **SSPC-PA 1:** Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel.

1.7 QUALITY ASSURANCE

A. **Hangers**, supports, guides, and anchors shall comply with the requirements of:

1. MSS SP-58.
2. ASME B31.9.

B. **Installation** of hangers, supports, guides, and anchors shall comply with MSS SP-69.

C. **Engineering responsibility:** Design and preparation of Shop Drawings and calculations for each multiple pipe support and trapeze by a qualified professional engineer.

1. **Professional engineering 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 hangers and supports that are similar to those indicated for this Project in material, design, and extent.

D. **Hangers**, supports, guides, and anchors shall comply with the requirements of ASME B31.1, Power Piping, including design, fabrication, and installation, when they support:

1. **Steam piping systems** operating at 250 degrees F (120 degrees C) and higher or 15 psig (100 kPa) and higher.

E. **Ball Valves:**

1. **ASME Compliance:** ASME B31.1 for power piping valves and ASME B31.9 for building services piping valves. Exceptions: Domestic hot- and cold-water, sanitary waste, and storm drainage piping valves unless referenced.
2. **ASME Compliance for Ferrous Valves:** ASME B16.10 and ASME B16.34 for dimension and design criteria.
3. **NSF Compliance:** NSF 61 for valve materials for potable-water service.

F. **All piping materials** shall bear label, stamp, or other markings of specified testing agency.

1.8 DELIVERY, STORAGE, AND HANDLING

A. **Valves:** Prepare valves for shipping as follows:

1. **Protect** internal parts against rust and corrosion.

2. **Protect** threads, flange faces, grooves, and weld ends.
3. **Set angle**, gate, and globe valves closed to prevent rattling.
4. **Set ball** and plug valves open to minimize exposure of functional surfaces.

5. **Use the following** precautions during storage: Maintain valve end protection. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

PART 2 - PRODUCTS

2.1 STEEL PIPE HANGERS AND SUPPORTS

A. **Description:** MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. **Galvanized, Metallic Coatings:** Pre-galvanized or hot dipped.

C. **Nonmetallic Coatings:** Plastic coating, jacket, or liner.

D. **Thermal-hanger Shield Inserts:** 600-psig- (4140-kPa-) minimum, compressive-strength insulation insert encased in sheet metal shield, with insulation same thickness as piping insulation.

1. **Insulation-Insert Material for Cold or Hot Piping:** Water-repellent treated, ASTM C 533, Type I calcium silicate. Vapor barrier required for cold piping applications.
2. **For Clevis or Band Hangers:** Insert and shield shall cover entire circumference of pipe.
3. **Insert Length:** Extend at least one inch (25 mm) beyond each side of the sheet metal shield for installation of vapor barrier tape.

E. **Fastener Systems, to Masonry Construction:** Mechanical-Expansion Anchors **-** Insert-wedge-type zinc-coated or stainless steel, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used. Fasteners to ceilings shall be vibration- and shock-resistant.

F. **Miscellaneous Materials:**

1. **Structural Steel:** ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
2. **Grout:** ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

a. *Properties:* Nonstaining, noncorrosive, and nongaseous.
b. *Design Mix:* 5000-psi (34.5-MPa), 28-day compressive strength.

2.2 STEEL PIPE AND FITTINGS

A. **Galvanized Steel Pipe:** ASTM A 53/A 53M, Type E or S, Grade A or B, Schedule 40, galvanized. Include ends matching joining method.

1. **Malleable-Iron Unions:** ASME B16.39, Class 150, hexagonal-stock body, with ball-and-socket, metal-to-metal, bronze seating surface and female threaded ends.
2. **Gray-Iron, Threaded Fittings:** ASME B16.4, Class 125, galvanized, standard pattern.
3. **Cast-Iron Flanges:** ASME B16.1, Class 125.
4. **Cast-Iron, Flanged Fittings:** ASME B16.1, Class 125, galvanized.
5. **Elbows** in piping NPS 4 (DN 100) and larger shall be long radius type.

2.3 COPPER TUBE AND FITTINGS

A. **Hard Copper Tube:** Domestic water, ASTM B 88, Type K (ASTM B 88M, Type A), drawn temper.

1. **Copper Pressure Fittings:** ASME B16.18, cast-copper-alloy or ASME B16.22, wrought- copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. **Bronze Flanges:** ASME B16.24, Class 150, with solder-joint ends.
3. **Copper Unions:** ASME B16.18, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint ends.
4. **Elbows** in piping NPS 4 (DN 100) and larger shall be long radius type.

2.4 BALL VALVES

A. **Valves, General:** Refer to Part 3 "Valve Applications" Article for applications of valves.

1. **Obtain AOC's approval** for selection/use of butterfly, check, gate, glove, or other type valve.
2. **Bronze Valves:** NPS 2 (DN 50) and smaller with threaded ends, unless otherwise indicated.
3. **Ferrous Valves:** NPS 2-1/2 (DN 65) and larger with flanged ends, unless otherwise indicated.
4. **Valve Pressure and Temperature Ratings:** Not less than indicated and as required for system pressures and temperatures.
5. **Valve Sizes:** Same as upstream pipe, unless otherwise indicated.
6. **Valve Actuators:**

   a. *Chainwheel:* For attachment to valves, of size and mounting height, as indicated in the "Valve Installation" Article in Part 3.
   b. *Gear Drive:* For quarter-turn valves NPS 8 (DN 200) and larger.
   c. *Handwheel:* For valves other than quarter-turn types.
   d. *Lever Handle:* For quarter-turn valves NPS 6 (DN 150) and smaller, except plug valves.
   e. *Wrench:* For plug valves with square heads. Furnish AOC with 1 wrench for every 10 plug valves, for each size square plug head.

7. **Extended Valve Stems:** On insulated valves.
8. **Valve Flanges:** ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves, and ASME B16.24 for bronze valves.
9. **Solder Joint:** With sockets according to ASME B16.18. Caution: Use solder with melting point below 840 deg F (454 deg C) for angle, check, gate, and globe valves; below 421 deg F (216 deg C) for ball valves.
10. **Threaded:** With threads according to ASME B1.20.1.
11. **Valve Bypass and Drain Connections:** MSS SP-45.

B. **Bronze Angle Valves:**

1. Bronze Angle Valves, General: MSS SP-80, with ferrous-alloy handwheel.
2. Type 2, Class 125, Bronze Angle Valves: Bronze body with PTFE or TFE disc.

C. **Cast-Iron Angle Valves:**

1. Cast-Iron Angle Valves, General: MSS SP-85, Type II.
2. Class 125, Cast-Iron Angle Valves: Bronze mounted with gray-iron body and bronze seats.

D. **Copper-Alloy Ball Valves:**

1. Copper-Alloy Ball Valves, General: MSS SP-110.
2. Two-Piece, Copper-Alloy Ball Valves: Class 150, Bronze body with full port for sizes NPS ½ (DN 15) and smaller and conventional-port for larger sizes, stainless steel ball, PTFE or TFE seats; and 600-psig (4140-kPa) minimum CWP rating and blowout-proof stainless steel stem. Vinyl covered steel lever handle with extension for insulation.
3. Safety-Exhaust, Copper-Alloy Ball Valves: 29 CFR 1910.147, two-piece bronze body with exhaust vent opening, chrome-plated ball with vent, blowout-proof stem, locking handle, and working pressure rating for compressed air of at least 125 psig (860 kPa) of 600-psig (4140-kPa) CWP.

E. **Ferrous-Alloy Ball Valves:**

1. Ferrous-Alloy Ball Valves, General: MSS SP-72, with flanged ends.
2. Ferrous-Alloy Ball Valves: Class 150, conventional port stainless steel ball and stem; TFE seats; 200-psig minimum CWP rating and blow-out-proof stem.

2. 5 PIPE EXPANSION FITTINGS AND LOOPS

A. **Expansion Joints:**

1. **Metal-Bellows Expansion Joints:** ASTM F 1120, circular-corrugated-bellows type with external tie rods.

2. **Expansion Compensators:** Double-ply corrugated steel, stainless-steel, or copper-alloy

bellows in a housing with internal guides, antitorque device, and removable end clip for positioning.

2.6 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. **Pipe and Fittings:** ASTM A 74, Service class.

B. **Gaskets:** ASTM C 564, rubber.

2.7 DUCTILE-IRON PIPE AND FITTINGS

A. **Mechanical-Joint, Ductile-Iron Pipe:** AWWA C151, with mechanical-joint bell and plain spigot end, unless grooved or flanged ends are indicated.

1. **Mechanical-Joint, Ductile-Iron Fittings:** AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
2. **Glands, Gaskets, and Bolts:** AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

B. **Flanges:** ASME 16.1, Class 125, cast iron

2.8 COMMERCIAL PLUMBING FIXTURES

A. **Lavatory Faucets:** Electronic, hard-wired mixing valve. Coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor. Comply with ASME A112.18.1.

1. **Body Material:** Commercial, solid brass.
2. **Finish:** Polished chrome plate.
3. **Maximum Flow Rate:** 2 gpm (6 L/min.).
4. **Centers:** 8 inches (203 mm), or as appropriate to lavatory selected.
5. **Mounting:** Deck
6. **Inlet(s):** NPS 3/8 (DN 10) tubing, plain end.
7. **Spout:** Rigid type.
8. **Spout Outlet:** Aerator.
9. **Operation:** Public restrooms- Solenoid valve with built-in strainer, activated by detecting motion at sensors. Staff and private toilets may be compression, manual type -- coordinate faucet selection with jurisdictional superintendent.
10. **Drain:** Grid.

B. **Bathtub/Shower Faucets:** Single-handle thermostatic/pressure-balance valve for bathtub and for shower. Include hot- and cold-water indicators; check stops; tub spout; and shower head, arm, and flange. Coordinate faucet inlets with supplies; coordinate outlet with diverter valve. Comply with ASME A112.18.1.

1. **Body Material:** Solid brass with nonmetallic trim.

2. **Finish:** Polished chrome plate.
3. **Maximum Flow Rate:** 2.5 gpm (9.5 L/min.), unless otherwise indicated.
4. **Diverter Valve:** Not required.
5. **Mounting:** Concealed.
6. **Bathtub Spout:** Chrome-plated brass.
7. **Operation:** Non-compression, manual.
8. **Antiscald Device:** Integral with mixing valve.
9. **Check Stops:** Check-valve type, integral with or attached to body; on hot- and cold-water supply connections; accessible from cover plate.
10. **Supply Connections:** Sweat; NPS ½.
11. **Shower Head Type:** Integral with mounting flange.
12. **Shower Head Material:** Metallic with chrome-plated finish.
13. **Spray Pattern:** Adjustable.
14. **Integral Volume Control:** Required.

C. **Sink Faucets, Description:** Service sink faucet with stops in shanks, vacuum breaker, hose-thread outlet, and pail hook. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.

1. **Body Material:** Commercial, solid brass..
2. **Finish:** Polished chrome plate.
3. **Maximum Flow Rate:** 2.5 gpm (9.5 L/min.), unless otherwise indicated.
4. **Mixing Valve:** Two-lever handles.
5. **Backflow Protection Device for Hose Outlet:** Required.
6. **Centers:** 8 inches (203 mm).
7. **Mounting:** [**Back/wall**], [**exposed**].
8. **Handle(s):** Cross, four arm.
9. **Inlet(s):** NPS ½ (DN 15) female shank.
10. **Spout Type:** Rigid, solid brass with wall brace.
11. **Spout Outlet:** Hose thread.
12. **Vacuum Breaker:** Required.
13. **Operation:** Compression, manual.
14. **Drain:** Not required.

D. **Flushometers:** Flushometer for urinal and water-closet-type fixture. Include brass body with corrosion-resistant internal components, non-hold-open feature, control stop with check valve, vacuum breaker, copper or brass tubing, and polished chrome-plated finish on exposed parts.

1. **Internal Design:** Diaphragm operation.
2. **Style:** Exposed with concealed electronics.
3. **Inlet Size:** NPS 3/4 (DN 20).
4. **Trip Mechanism:** Hard-wired, electric-sensor actuator.
5. **Consumption:** 1.0 gal./flush (1.9 L/flush) (urinals) or 1.6 gal./flush (5.7 L/flush) (water closets).
6. **Tailpiece Size:** NPS 3/4 (DN 20) and standard length to top of bowl.

E. **Toilet Seats:** Toilet seat for water-closet-type fixture.

1. **Material:** Molded, solid plastic with antimicrobial agent.
2. **Configuration:** Open front without cover.
3. **Size:** Elongated.
4. **Hinge Type:** SS, self-sustaining or SC, self-sustaining, check.
5. **Class:** Heavy-duty commercial.
6. **Color:** White.

F. **Protective Shielding Pipe Covers:** Manufactured molded plastic for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements. Fasteners shall be nylon. Color shall be white.

G. **Fixture Supports:**

1. **Water-Closet Supports:** Combination carrier designed for accessible and standard mounting height of wall-mounting, water-closet-type fixture. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.
2. **Urinal Supports:** Type I, urinal carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture or II, urinal carrier with hanger and bearing plates for wall-mounting, urinal-type fixture as appropriate to urinal specified. Include steel uprights with feet.

   a. **Accessible-Fixture Support:** Include rectangular steel uprights.

3. **Lavatory Supports, Description:** Type III, lavatory carrier with hanger plate and tie rod for wall-mounting, lavatory-type fixture. Include steel uprights with feet.

   a. *Accessible-Fixture Support:* Include rectangular steel uprights.

4. **Sink Supports, Description:** Type II, sink carrier with hanger plate, bearing studs, and tie rod for sink-type fixture. Include steel uprights with feet.

H. **Hair Interceptors:** Manufactured unit with removable screen or strainer and removable cover; designed to trap and retain hair.

1. **Material:** Brass or stainless-steel body.
2. **Pipe Connections:** NPS 1-1/4 (DN 32).

I. **Sediment Interceptors:** Manufactured unit with removable screens or strainer and removable cover; designed to trap and retain waste material.

1. **Material:** Cast-iron or steel body with acid-resistant lining and coating.

2. **Pipe Connections:** NPS 1-1/2 (DN 40) or NPS 2 (DN 50), as appropriate.

J. **Water Closets:** Wall-mounting, back-outlet, vitreous-china fixture designed for flushometer valve operation.

1. **Style:** One piece.
2. **Bowl Type:** Elongated with siphon-jet design and 1-1/2-inch (38-mm) top spud connection.
3. **Design Consumption:** 1.6 gal./flush (6 L/flush).
4. **Trip Mechanism:** Electronic actuator.
5. **Color:** White.
6. **Height:** Standard or Accessible, as indicated.

K. **Urinals:** Wall-mounting, back-outlet, vitreous-china fixture designed for flushometer valve operation.

1. **Type:** Siphon jet with extended shields and 3/4-inch (19-mm) top spud connection.
2. **Strainer or Trapway:** Open trapway with integral trap.
3. **Design Consumption:** 1 gal./flush (3.8 L/flush).
4. **Color:** White.
5. **Supply Spud Size:** NPS 3/4 (DN 20).
6. **Outlet Size:** NPS 2 (DN 50).

L. **Urinals, Accessible:** Accessible, wall-mounting, bottom-outlet, vitreous-china fixture designed for flushometer valve operation.

1. **Type:** Siphon jet with extended shields and 3/4-inch (19-mm) top spud connection.
2. **Strainer or Trapway: Open trapway** with integral trap.
3. **Design Consumption:** 1 gal./flush (3.8 L/flush).
4. **Color:** White.
5. **Supply Spud Size:** NPS 3/4 (DN 20).
6. **Outlet Size:** NPS 1-1/2 (DN 40).
7. **Drain Piping:** NPS 2 (DN 50)
8. **Mounting height:** 24 inches (607 mm) floor to lip.

M. **Lavatories, Description:** Wall-mounting, vitreous-china fixture.

1. **Type:** Slab top with shroud to conceal piping .
2. **Size:** 22 by 18 inches rectangular.
3. **Faucet Hole Punching:** Three holes, 8-inch centers.
4. **Faucet Hole Location:** Top.
5. **Color:** White.
6. **Faucet:** Lavatory.
7. **Supplies:** NPS 3/8 (DN 10) chrome-plated copper with stops.
8. **Drain:** Grid.
9. **Drain Piping:** Public and Staff Restrooms - NPS 1-1/4 by NPS 1-1/2 (DN 32 by DN 40); Private toilets - NPS 1-1/4 (DN 32); chrome-plated, cast-brass P-trap; and wall

escutcheon.

10. **Protective Shielding Guard(s):** As specified.

N. **Lavatories, Undercounter:** Undercounter-mounting, vitreous-china fixture.

1. **Type:** Flat rim with ledge.
2. **Oval Lavatory Size:** 19 by 16 inches.
   Faucet Hole Punching: Three holes, 8-inch centers.
3. **Faucet Hole Location:** Top.
4. **Color:** White.
5. **Faucet:** Lavatory.
6. **Supplies:** NPS 3/8 (DN 10) chrome-plated copper with stops.
7. **Drain: Grid**.
8. **Drain Piping**: NPS 1-1/4 by NPS 1-1/2 (DN 32 by DN 40)] chrome-plated, cast-brass P-trap; and wall escutcheon.
9. **Protective Shielding Guard(s):** If accessible.

O. **Lavatories, Accessible:** Accessible, wall-mounting, vitreous-china fixture designed for people in wheelchairs.

1. **Type:** Slab top with shroud to conceal piping.
2. **Size:** 22 by 18 inches minimum; rectangular.
3. **Faucet Hole Punching:** Three holes, 8-inch centers.
4. **Color:** White.
5. **Faucet:** Lavatory for separate drain.
6. **Supplies:** NPS 3/8 (DN 10) chrome-plated copper with stops.
7. **Drain:** Grid.
8. **Drain Piping:** NPS 1-1/4 by NPS 1-1/2 (DN 32 by DN 40)] chrome-plated, cast-brass P-trap; and wall escutcheon.

P. **Service Sinks:** Trap-standard- and wall-mounting, enameled, cast-iron fixture with roll-rim with two faucet holes in back and rim guard on front and sides.

1. **Size:** 24 by 20 inches.
2. **Color:** White.
3. **Faucet:** Sink.
4. **Drain:** Grid withNPS 3 (DN 80) outlet.
5. **Trap Standard:** NPS 3 (DN 80) enameled, cast iron with cleanout and floor flange.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. **Specific hanger and support requirements**, hanger types and spacing, and hanger rod sizing are specified in Sections specifying piping systems and equipment.

B. **Comply with MSS SP-69** for pipe hanger selections and applications that are not specified in piping system Sections.

C. **Use hangers and supports** with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.

D. **Use nonmetallic** coatings or copper plating on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. **Horizontal-Piping Hangers and Supports:** Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. **Adjustable, Steel Clevis Hangers (MSS Type 1):** For suspension of non-insulated or insulated stationary pipes, NPS ½ to NPS 30 (DN 15 to DN 750).
2. **Adjustable Swivel-Ring Band Hangers, copper-plated, (MSS Type 10):** For suspension of non-insulated copper stationary pipes, NPS ½ to NPS 2 (DN 15 to DN 50).
3. **U-Bolts (MSS Type 24):** For support of heavy pipes, NPS ½ to NPS 30 (DN 15 to DN 750).
4. **Pipe Stanchion Saddles (MSS Type 37):** For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
5. **Single Pipe Rolls (MSS Type 41):** For suspension of pipes, NPS 1 to NPS 30 (DN 25 to DN 750), from 2 rods if longitudinal movement caused by expansion and contraction might occur.
6. **Adjustable Roller Hangers (MSS Type 43):** For suspension of pipes, NPS 2-1/2 to NPS 20 (DN 65 to DN 500), from single rod if horizontal movement caused by expansion and contraction might occur.
7. **Complete Pipe Rolls (MSS Type 44):** For support of pipes, NPS 2 to NPS 42 (DN 50 to DN 1050), if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
8. **Adjustable Pipe Roll and Base Units (MSS Type 46):** For support of pipes, NPS 2 to NPS 30 (DN 50 to DN 750), if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

F. **Vertical-Piping Clamps:** Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1 **Extension Pipe or Riser Clamps (MSS Type 8):** For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500).
2. **Carbon- or Alloy-Steel Riser Clamps (MSS Type 42):** For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500), if longer ends are required for riser clamps.

G. **Hanger-Rod Attachments:** Unless otherwise indicated and except as specified in piping system Sections, install the following type:

1. **Steel Turnbuckles (MSS Type 13):** For adjustment up to 6 inches (150 mm).

H. **Building Attachments:** Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. **Side-Beam or Channel Clamps (MSS Type 20):** For attaching to bottom flange of beams, channels, or angles.
2. **Center-Beam Clamps (MSS Type 21):** For attaching to center of bottom flange of beams.
3. **Welded Beam Attachments (MSS Type 22):** For attaching to bottom of beams.
4. **C-Clamps (MSS Type 23):** For structural shapes.
5. **Top-Beam Clamps (MSS Type 25):** For top of beams if hanger rod is required tangent to flange edge.
6. **Welded-Steel Brackets:** For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

   a. *Light (MSS Type 31):* 750 lb (340 kg).
   b. *Medium (MSS Type 32):* 1500 lb (680 kg).
   c. *Heavy (MSS Type 33):* 3000 lb (1360 kg).

7. **Side-Beam Brackets (MSS Type 34):** For sides of steel beams.

I. **Shields:** Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. **Protection Shields (MSS Type 40):** For insulated piping, NPS ½ to NPS 1-1/2 (DN 15 to DN 40).
2. **Thermal-Hanger Shield Inserts:** For insulated piping, NPS 2 (DN 50) and larger. For piping NPS 8 (DN 200) and larger, provide 1/4-inch-thick steel wear plate, minimum 6 inches long.

J. **Other Hangers and Supports:** As approved by the AOC.

K. **Comply with MSS SP-69** for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

L. **Comply with MFMA-102** for metal framing system selections and applications that are not specified in piping system Sections.

M. **Use mechanical-expansion anchors** or other AOC-approved anchors instead of building attachments where required in concrete construction.

N. **Hanger and Support Installation:** Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

3.2 PIPE AND FITTING APPLICATIONS

A. **Transition and special fittings** with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

B. **Flanges** may be used on aboveground piping, unless otherwise indicated.

C. **Aboveground Domestic Water Piping:** Do not use galvanized piping for domestic hot water system. Use any of the following piping materials for each size range:

1. **NPS 4 (DN 100) and Smaller:** Hard copper tube, Type K (Type A); copper pressure fittings; and soldered joints.
2. **NPS 5 (DN 125) and larger:** Hard copper tube, Type K (Type B); copper pressure fittings; and soldered joints.
3. **NPS 5 (DN 125) and larger:** Galvanized steel pipe; gray-iron fittings and joints; or cast-iron flanged joints and fittings.

D. **General-Duty Valve Applications:** Unless otherwise indicated, use the following valve types:

1. Shutoff Duty: Use bronze ball or gate valves for piping NPS 2 (DN 50) and smaller. Use cast-iron gate valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.
2. Throttling Duty: Use bronze globe valves for piping NPS 2 (DN 50) and smaller. Use cast-iron globe valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.
3. Domestic Hot-Water System, Balancing Duty: Calibrated balancing valves.

E. **Install shutoff valve** close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops.

F. **Install drain valves** for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

3.3 PIPING INSTALLATION

A. **Install cast-iron sleeve** with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight.

B. **Install shutoff valves**, hose-end drain valve, basket strainer, pressure gages, backflow preventer, and plumbing specialties as indicated on the drawings, inside the building at each domestic water service entrance.

C. **Install** domestic water piping level without pitch and plumb.

D. **Provide dielectric fittings** between dissimilar metals.

3.4 JOINT CONSTRUCTION

A. **Soldered Joints:** Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

B. **Join hub-and-spigot**, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

3.5 CONNECTIONS

A. **Install piping adjacent** to equipment and machines to allow service and maintenance.

B. **Connect domestic water piping** to exterior water-service piping. Use dielectric fitting to join dissimilar piping materials.

C. **Connect domestic water piping** to water-service piping at shutoff valve, and extend and connect to the following:

1. **Booster Pumps:** Cold-water suction and discharge piping.
2. **Plumbing Fixtures:** Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code.
3. **Equipment:** Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 (DN 65) and larger.

3.6 PLUMBING FIELD QUALITY CONTROL

A. **Inspect** domestic water piping as follows:

1. **Do not enclose**, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. **During installation**, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

   a. *Roughing-in Inspection:* Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
   b. *Final Inspection:* Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

3. **Reinspection:** If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
4. **Reports:** Prepare inspection reports and have them signed by authorities having jurisdiction.

3.7 PLUMBING ADJUSTING

A. **Perform** the following adjustments before operation:

1. **Close drain** valves, hydrants, and hose bibbs.
2. **Open shutoff** valves to fully open position.
3. **Open throttling** valves to proper setting.
4. **Adjust balancing** valves in hot-water-circulation return piping to provide adequate flow.

    a. Manually adjust balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.

5. **Remove plugs** used during testing of piping and plugs used for temporary sealing of piping during installation.
6. **Remove and** clean strainer screens. Close drain valves and replace drain plugs.
7. **Remove filter** cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. **Verify proper** settings, adjustments, and operation of plumbing.

3.8 CLEANING AND DISINFECTING

A. **Clean interior** of domestic water piping system. Remove dirt and debris as work progresses.

B. **Clean and disinfect** potable and non-potable domestic water piping as follows:

1. **Flush new piping and parts** of existing domestic water piping that have been altered, extended, or repaired before using.
2. **Use flushing and disinfecting procedures** prescribed by authorities having jurisdiction or as described below:
3. **Disinfect** the entire domestic water system installed under this contract, cold, hot and return piping, before using as follows:

    a. *Through* a NPS 0.75 (DN 20) hose connection in the main entering the building, pump in sufficient sodium hypochlorite to produce a free available chlorine residual of not less than 200 ppm. Provide plumbing connections and power for service organization for pumping chlorine into the system.
    b. *Proceed upstream* from the point of chlorine application, opening each faucet and tap until chlorine is detected. Close each faucet and tap when chlorine is evident.
    c. *When chlorinated water* has been brought to every faucet and tap with a minimum concentration of 200 ppm chlorine, retain this water in the system for at least three hours, but no more than 3.5 hours.
    d. At the end of the retention period, no less than 100 ppm of chlorine shall be present at the extreme end of the system.
    e. Open all faucets and taps and flush all lines until the chlorine residual in the water is less than one ppm.
    f. Obtain a representative water sample from the system for analysis by a recognized

bacteriological laboratory.

g. If the sample tested for coliform organisms is negative, the service organization shall submit a letter and laboratory report to the Contractor, certifying successful completion of the sterilization. Submit report.

h. If any samples tested indicate the presence of coliform organisms, the entire sterilization procedure shall be repeated.

I. Close main sprinkler valves or branch sprinkler valves prior to disinfection of system. Open valves when disinfection is complete.

C. **Prepare and** submit reports of flushing and disinfecting activities.

3.9 PLUMBING FIXTURES

A. **Examination:** Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.

1. **Examine cabinets**, counters, floors, and walls for suitable conditions where fixtures will be installed.
2. **Proceed** with installation only after unsatisfactory conditions have been corrected.

B. **Installation:** Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.

1. **Install** off-floor supports, affixed to building substrate, for wall-mounting fixtures.

   a. *Use carrier supports* with waste fitting and seal for back-outlet fixtures.
   b. *Use carrier supports* without waste fitting for fixtures with tubular waste piping.
   c. *Use chair-type carrier supports* with rectangular steel uprights for accessible fixtures.

2. **Install back-outlet**, wall-mounting fixtures onto waste fitting seals and attach to supports.
3. **Install floor-mounting fixtures** on closet flanges or other attachments to piping or building substrate.
4. **Install wall-mounting fixtures** with tubular waste piping attached to supports.
5. **Install floor-mounting**, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.
6. **Install counter-mounting** fixtures in and attached to casework.
7. **Install fixtures** level and plumb according to roughing-in drawings.
8. **Install water-supply piping** with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.

   a. *Exception:* Use ball, gate, or globe valves if supply stops are not specified with fixture. Ball valves are specified in Division 22 Specification, Article "Valves" - other valves to be used shall be approved by the AOC.

9. **Install trap and tubular** waste piping on drain outlet of each fixture to be directly

connected to sanitary drainage system.

10. **Install tubular waste piping** on drain outlet of each fixture to be indirectly connected to drainage system.
11. **Install flushometer valves** for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
12. **Install toilet seats** on water closets.
13. **Install faucet-spout fittings** with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
14. **Install water-supply** flow-control fittings with specified flow rates in fixture supplies at stop valves.
15. **Install faucet flow-control fittings** with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
16. **Install shower flow-control fittings** with specified maximum flow rates in shower arms.
17. **Install traps** on fixture outlets.

    a. Exception: Omit trap on fixtures with integral traps.
    b. Exception: Omit trap on indirect wastes, unless otherwise indicated.

18. **Install escutcheons** at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings.
19. **Set service basins** in leveling bed of cement grout.
20. **Seal joints** between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color.

C. **Connections:** Piping installation requirements are specified above. Drawings indicate general arrangement of piping, fittings, and specialties. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

1. **Connect wiring** and ground equipment according to Division 26 specifications or per applicable code, whichever is more stringent.

D. **Field Quality Control:** Verify that installed plumbing fixtures are categories and types specified for locations where installed. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.

1. **Inspect installed** plumbing fixtures for damage. Replace damaged fixtures and components.
2. **Test installed** fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
3. **Install fresh** batteries in sensor-operated mechanisms.

E. **Adjusting:** Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

1. **Operate** and adjust controls. Replace damaged and malfunctioning units and controls.
2. **Adjust water pressure** at faucets and flushometer valves to produce proper flow and stream.
3. **Replace washers** and seals of leaking and dripping faucets and stops.
4. **Install fresh** batteries in sensor-operated mechanisms.

F. **Cleaning:** Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:

1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
2. Remove sediment and debris from drains.
3. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

G. **Protection:** Provide protective covering for installed fixtures and fittings. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by AOC.

END OF DIVISION TWENTY-TWO

DIVISION TWENTY-THREE - HEATING, VENTILATING, & AIR CONDITIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes the following hangers and supports for mechanical system piping and equipment:

1. Hydronic piping and pumps
2. Steam and condensate piping and pumps for systems up to 150 psig.
3. Rectangular ducts and liners
4. Air duct accessories
5. Integral diffuser air terminal units

1.3 DEFINITIONS

A. **HP Systems:** High-pressure steam supply and steam condensate return systems operating at 15 psig (104 kPa) or more.

B. **LP Systems:** Low-pressure steam supply and steam condensate return systems operating at less than 15 psig (104 kPa).

1.4 REFERENCED STANDARDS

A. **ASTM International:**

1. ASTM A 36: Specification for Carbon Structural Steel
2. ASTM A 47: Specification for Ferritic Malleable Iron Castings
3. ASTM A 53: Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
4. ASTM A 126: Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
5. ASTM A 234/A 234M: Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
6. ASTM A 536: Specification for Ductile Iron Castings
7. ASTM A 733: Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
9. ASTM B 32: Specification for Solder Metal

10. ASTM B 88: Specification for Seamless Copper Water Tube

B. **ASME International:**

1. ASME B16.1: Cast Iron Pipe Flanges and Flanged Fittings
2. ASME B16.3: Malleable Iron Threaded Fittings
3. ASME B16.4: Cast-Iron Threaded Fittings
4. ASME B16.5: Pipe Flanges and Flanged Fittings, NPS1/2 to NPS 24
5. ASME B16.39: Malleable Iron Threaded Pipe Unions
6. ASME B31.1: Power Piping
7. ASME B31.9: Building Services Piping
8. ASME Boiler and Pressure Vessel Code: Section II, Part C, "Welding Rods, Electrodes, and Filler Metals"; Section IV, "Heating Boilers"; Section VIII, "Pressure Vessels"; Section IX, "Welding and Brazing Qualifications"

C. **Manufacturers Standardization Society of the Valve and Fittings Industry:**

1. MSS SP-58: Pipe Hangers and Supports-Materials, Design and Manufacturer

D. **Hydraulic Institute:**

1. HI 1.1-1.5: Centrifugal Pumps for Nomenclature, Definitions, Application and Operati on (ANSI).

1.5 **SUBMITTALS**

A. **Product Data:**

1. Each type of pipe, fitting, joining material, valve, and specialty specified. Include construction materials, sizes, temperature and pressure rated capacities, options and accessories, end connection details, dimensions and required clearances, manufacturer's installation instructions.
2. Pumps: Include certified performance curves and rated capacities, operating characteristics, furnished specialties, final impeller dimensions, and accessories for each type of product indicated. Indicate pump's operating point on curves.
3. Each type of duct and accessory specified.

B. **Shop Drawings:**

1. **Piping:** Detail fabrication of pipe anchors, hangers, special pipe support assemblies, alignment guides, expansion joints and loops, and their attachment to the building structure. Detail location of anchors, alignment guides, and expansion joints and loops. Include dimensions, loadings, required clearances, and size/location/methods of field assembly for each connection.

2. **Detail flash tank** assemblies for steam and condensate piping.
3. **Pumps:** Show pump layout and connections. Include wiring diagrams showing power, signal and control wiring. Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.

4. **Duct fabrication**, assembly, and installation drawings, including plans, elevations, sections, components, and attachments to other work. Drawings should include the following:

   a. Duct layout indicating sizes and pressure classes.
   b. Elevations of top and bottom of ducts.
   c. Dimensions of main duct runs from building grid lines.
   d. Penetrations through fire-rated and other partitions.
   e. Duct accessories, including access doors and dampers.
   f. Locations of wall and ceiling registers, grilles, and vents.

C. **Field Test Reports:** Written reports of tests specified in Part 3 of this Section. Include the following:
   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Failed test results and corrective action taken to achieve requirements.

D. **Operation and Maintenance Data:** For pumps to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. **General:** For many applications, more than one type of material specified may be used. Coordinate material selection with the House Superintendent to ensure best quality as well as compatibility with existing systems.

B. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. **ASME Compliance:** Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.

D. **Performance requirements** for duct construction is as follows:

   1. Duct construction pressure class requirements for each system shall be as indicated in the “Duct Construction Schedule” in Part 3 of this section.
   2. For systems not indicated in the Duct Construction Schedule, the duct construction pressure class shall be determined as follows:

Fan External Static Pressure (Positive or Negative)	SMACNA Duct Construction Pressure Class (Positive or Negative)
Up to 1.4 inches	2.0 inch (50 Pa)
1.41 to 2.0 inches	3.0 inch (75 Pa)
2.1 to 3.0 inches	4.0 inch (100 Pa)
3.1 to 4.0 inches	6.0 inch (150 Pa)

E. **Duct Air Leakage:** Duct air leakage shall not exceed the leakage factor associated with the duct pressure class and test pressure, as indicated in the following table.

Duct Pressure Class (inches w.c.)	Leakage Class	Test Pressure (inches w.c.)	Leakage Factor
2.0 (50 Pa)	6	2.0 (50 Pa)	10
3.0 (75 Pa)	6	3.0 (75 Pa)	13
4.0 (100 Pa)	3	4.0 (100 Pa)	8
6.0 (150 Pa)	3	6.0 (150 Pa)	10
10.0 (250 Pa)	3	10.0 (250 Pa)	15

Note: Leakage factor is CFM/100 sq. ft. of duct surface area.

1.7 SYSTEMS COORDINATION

A. **Coordinate layout and installation** of piping, ducts, and suspension system components with other construction, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

B. **Coordinate sleeve installations** for foundation wall penetrations.

C. **Coordinate piping installation** with roof curbs, concrete bases, equipment supports, and roof penetrations.

D. **Coordinate penetrations** through exterior walls and floor assemblies with requirements for firestopping specified in Division 7 Specification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. **Manufacturer's Preparation for Shipping:** Clean flanges and exposed machined metal surfaces and treat with anticorrosion compound after assembly and testing. Protect flanges, pipe openings, and nozzles with wooden flange covers or with screwed-in plugs.

B. **Store** pumps in dry location.

C. **Retain protective covers** for flanges and protective coatings during storage.

D. **Protect bearings** and couplings against damage from sand, grit, and other foreign matter.

E. **Comply** with pump manufacturer's written rigging instructions.

PART 2 - PRODUCTS

2.1 HYDRONIC PIPING

A. **Drawn-Temper Copper Tubing:** ASTM B 88, Type L (ASTM B 88M, Type M). Below grade, use type K, annealed temper copper tubing.

B. **Wrought-Copper Fittings and Unions:** ASME B16.22.

C. **Steel Pipe, NPS 2 (DN 50) and Smaller:** ASTM A 53, Type S (seamless) or Type F (furnace-butt welded), Grade A, Schedule 40, black steel, plain ends. For screwed piping, use Schedule 80.

D. **Steel Pipe, NPS 2-1/2 through NPS 12 (DN 65 through DN 300):** ASTM A 53, Type E (electric-resistance welded), Grade A, Schedule 40, black steel, plain ends.

E. **Steel Pipe, NPS 14 through NPS 18 (DN 350 through DN 450):** ASTM A 53, Type E (electric-resistance welded) or Type S (seamless), Grade B, Schedule 30, black steel, plain ends.

F. **Steel Pipe Nipples:** ASTM A 733, made of ASTM A 53, Schedule 40, black steel; seamless for NPS 2 (DN 50) and smaller and electric-resistance welded for NPS 2-1/2 (DN 65) and larger.

2.2 HYDRONIC SPECIALTIES

A. **Manual Air Vent:** Bronze body and nonferrous internal parts; 150-psig (1035-kPa) working pressure; 225 deg F (107 deg C) operating temperature; manually operated with screwdriver or thumbscrew; with NPS 1/8 (DN 6) discharge connection and NPS ½ (DN 15) inlet connection.

B. **Expansion Tanks (Bladder type):** Welded carbon steel, rated for 125-psig (860-kPa) working pressure and 240 deg F (116 deg C) maximum operating temperature. Separate air charge from system water to maintain design expansion capacity by a flexible bladder securely sealed into tank. Flexible bladder shall be flexible but not stretchable, removable for replacement and inspection. Include drain fitting and taps for pressure gage and air-charging fitting. Support vertical tanks with steel legs or base; support horizontal tanks with steel

saddles. Factory fabricate and test tank with taps and supports installed and labeled according to the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.

C. **Flexible Connectors:** Stainless-steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket; 150-psig (1035-kPa) minimum working pressure and 250 deg F (121 deg C) maximum operating temperature. Connectors shall have flanged- or threaded-end connections to match equipment connected and shall be capable of 3/4-inch (20-mm) misalignment.

2.3 SEPARATELY COUPLED, HORIZONTAL, IN-LINE CENTRIFUGAL PUMPS

A. **Description:** Factory-assembled and -tested, centrifugal, overhung-impeller, separately coupled, in-line pump as defined in HI 1.1-1.2 and HI 1.3; designed for installation with pump and motor shafts mounted horizontally. Rate pump for 175-psig minimum working pressure and a continuous water temperature of 225 deg F.

B. **Pump Construction:**

1. **Casing:** Radially split, cast iron, with threaded gage tappings at inlet and outlet, and 125 psi ANSI-rated companion-flange connections.
2. **Impeller:** ASTM B 584, cast bronze; statically and dynamically balanced, and keyed to shaft. Trim impeller to match specified performance.
3. **Pump Shaft:** Stainless steel.
4. **Mechanical Seal:** Carbon rotating ring against a ceramic seat held by a stainless-steel spring, and flexible bellows and gasket. Include water slinger on shaft between motor and seal.
5. **Pump Bearings:** Permanently lubricated ball bearings or oil lubricated; bronze-journal or thrust type.

C. **Shaft Coupling:** Molded rubber insert with interlocking spider capable of absorbing vibration.

D. **Motor:** Single speed, with permanently lubricated ball bearings, and resiliently mounted to pump casing.

2.4 SEPARATELY COUPLED, VERTICAL, IN-LINE CENTRIFUGAL PUMPS

A. **Description:** Factory-assembled and -tested, centrifugal, overhung-impeller, separately coupled, in-line pump as defined in HI 1.1-1.2 and HI 1.3; designed for installation with pump and motor shafts mounted vertically. Rate pump for 175-psig minimum working pressure and a continuous water temperature of 225 deg F.

B. **Pump Construction:**

1. **Casing:** Radially split, cast iron, with replaceable throttle bushing, threaded gage tappings at inlet and outlet, and 125 psi ANSI-rated companion-flange connections.

2. **Impeller:** ASTM B 584, cast bronze; statically and dynamically balanced, keyed to shaft, and secured with a locking cap screw. Trim impeller to match specified performance.
3. **Pump Shaft:** Stainless steel.
4. **Mechanical Seal:** Outside balanced type carbon rotating ring against a ceramic seat held by a stainless-steel spring, and flexible bellows and gasket. Include water slinger on shaft between motor and seal.

C. **Shaft Coupling:** Axially split spacer coupling.

D. **Motor:** Single speed, with permanently lubricated ball bearings, rigidly mounted to pump casing with lifting eye and supporting lugs in motor enclosure.

2.5 HYDRONIC PUMP SPECIALTY FITTINGS

A. **Suction Diffuser:** Angle pattern, 175-psig (1204-kPa) pressure rating, cast-iron body and end cap, pump-inlet fitting; with bronze startup and bronze or stainless-steel permanent strainers; bronze or stainless-steel straightening vanes; drain plug; and factory-fabricated support.

B. **Triple-Duty Valve:** Angle or straight pattern, 175-psig (1204-kPa) pressure rating, cast-iron body, pump-discharge fitting; with drain plug and bronze-fitted shutoff, balancing, and check valve features. Brass gage ports with integral check valve, and orifice for flow measurement.

2.6 STEAM AND CONDENSATE PIPE AND FITTINGS

A. **Low Pressure Steam Supply:**

1. **Steel Pipe, NPS 2 (DN 50) and Smaller:** ASTM A 53, Type S (seamless) or Type F (furnace-butt welded), Grade A, Schedule 40, black steel, plain ends.
2. **Steel Pipe, NPS 2-1/2 through NPS 12:** ASTM A 53, Type E (electric-resistance welded), Grade A, Schedule 40, black steel, plain ends. Use Schedule 80 standard weight steel pipe.

B. **Medium and High Pressure Steam Supply:**

1. **Steel Pipe, NPS 2 (DN 50) and Smaller:** Schedule 80 carbon steel with threaded joints, using Class 300 or greater fittings.
2. **Steel Pipe, NPS 2 -1/2 or greater:** Schedule 40 carbon steel with welded joints, using Class 150 or greater steel fittings. Use Schedule 80 for high-pressure condensate.

C. **Steel Pipe, NPS 14 through NPS 20 (DN 350 through DN 500):** ASTM A 53, Type E (electric-resistance welded) or Type S (seamless), Grade B, Schedules 30 and XS, black steel, plain ends.

D. **Cast-Iron Threaded Fittings:** ASME B16.4; Classes 125, 150, and 300.

E. **Malleable-Iron Threaded Fittings:** ASME B16.3; Classes 150 and 300.

F. **Malleable-Iron Unions:** ASME B16.39; Classes 150, 250, and 300.

G. **Cast-Iron Threaded Flanges and Flanged Fittings:** ASME B16.1, Classes 125 and 250; raised ground face, and bolt holes spot faced.

H. **Wrought-Steel Fittings:** ASTM A 234/A 234M, wall thickness to match adjoining pipe.

I. **Wrought-Steel Flanges and Flanged Fittings:** ASME B16.5, including bolts, nuts, and gaskets of material group 1.1, with butt welding end connections, and raised facings:

J. **Welding Materials:** Comply with Section II, Part C, of the ASME Boiler and Pressure Vessel Code for welding materials appropriate for wall thickness and for chemical analysis of pipe being welded.

K. **Gasket Material:** Thickness, materials, and type suitable for fluid to be handled and for design temperatures and pressures.

2.7 SAFETY VALVES

A. **Size and Capacity:** As required for equipment according to the ASME Boiler and Pressure Vessel Code.

B. **Bronze Safety Valves, NPS ½ through 2-1/2 (DN 15 through DN 65):** Cast-bronze or forged copper body, Class 250, with threaded inlet and outlet; forged copper-alloy disc; fully enclosed, cadmium-plated steel spring with adjustable pressure range and positive shutoff, factory set and sealed.

C. **Cast-steel Safety Valves, NPS 1-1/2 through 6 (DN 40 through DN 150):** Cast steel body, Class 300; forged stainless steel disc and nozzle; fully enclosed, cadmium-plated steel spring with adjustable pressure range and positive shutoff; raised-face flanged inlet and outlet connections; factory set and sealed.

D. **Drip-pan Elbows:** ASTM A216 cast-iron body for unrestricted safety valve discharge, size to be the same as, or larger than, discharge of safety valve with integral 90-degree elbow, condensate basin, concentric discharge, and self-draining connection NPS 0.75 (DN 15) threaded. Vertical riser over discharge to be supported overhead to prevent riser loading onto elbow assembly. End connections NPS 1.5 (DN 40) and smaller threaded, and NPS 2 (DN 50) and larger raised-face flanged.

E. **Stop-Check Valves:** Class 250, malleable-iron body and bonnet, cylindrical disc, removable liner and machined seat, brass-alloy stem, outside screw and yoke, polytetrafluoroethylene-impregnated packing with 2-piece packing gland assembly, flanged end connections, and cast-iron handwheel.

2.8 PRESSURE-REDUCING VALVES

A. **Valve Characteristics:** Pilot-actuated, diaphragm type, normally-closed, with adjustable pressure range and ANSI/FCI 70.2 Class IV positive shutoff. Valves shall have cast-steel body with threaded connections for valves NPS 2 (DN 50) and smaller and ANSI B16.34 Class 300 flanged connections for valves NPS 2-1/2 (DN 65) and larger; and hardened stainless-steel trim, replaceable head and seat, main head stem guide fitted with flushing and pressure-arresting device, cover over pilot diaphragm, and non-asbestos gaskets.

B. **Size, Capacity, and Pressure Rating:** Select pressure-reducing valves to develop no more than 85 dBA at 3 feet elevation above adjacent floor and at 3 feet in any direction. Use Schedule 80 minimum for piping inlet and outlet connections to pressure-reducing valves, to achieve the required sound level, or use sound attenuators. Select pressure-reducing valves with no more than 20 percent additional capacity.

2.9 STEAM TRAPS

A. **Thermostatic Traps:** HP and LP systems; Class 125, bronze angle-pattern body with integral union tailpiece and screw-in cap; balanced-pressure, stainless-steel or monel bellows element; and renewable, hardened stainless-steel head and seat.

B. **Thermodynamic Traps:** HP and LP systems; Stainless-steel body and screw-in cap; maximum operating pressure of 600 psig (4140 kPa); stainless-steel disc and seat; threaded ends. Integral wye strainer not permitted.

1. For installations subject to freezing, provide aluminum or stainless steel integral insulating cap.

C. **Float and Thermostatic Traps:**

1. **HP systems:** ASTM A 216, cast-steel body and bolted cap; renewable, stainless-steel float mechanism with renewable, hardened stainless-steel head and seat; stainless-steel thermostatic air vent assembly; balanced-pressure, stainless-steel or monel thermostatic bellows element. Maximum operating pressure of 300 psig (2070 kPa); and maximum operating temperature of 450 deg F (232 deg C).
2. **LP systems:** ASTM A126, cast-iron body and bolted assembly, mechanical float ball type, renewable stainless steel internals including valve seat, valve head, pivot pins, float and brackets; integral stainless steel thermostatic air vent assembly. Maximum operating pressure of 125 psig (860 kPa), and maximum allowable temperature of 450 deg F at 125 psig.

D. **Inverted Bucket Traps:**

1. **HP systems:** ASTM A182, forged steel body and bolted assembly with flanged piping connections, mechanical inverted bucket type, maximum operating pressure of 250 psig

(1725 kPa), renewable stainless steel internals including bucket and valve guide assembly.

2. **LP systems:** Cast-iron body and cap, pressure rated for 250 psig (1725 kPa); stainless-steel head and seat; stainless-steel valve retainer, lever, and guide pin assembly; and brass or stainless-steel bucket.

   a. *Strainer:* Integral stainless-steel inlet strainer within the trap body.
   b. *Air Vent:* Stainless-steel thermostatic vent.

E. **Liquid Expansion Thermostatic Traps:** HP and LP; bronze body, liquid expansion thermostatic type, maximum operating pressure of 275 psig (1898 kPa), stainless steel valve and seat, brass element, NPT screwed connections.

1. **For installation** subject to freezing, factory set to discharge condensate at a fixed temperature below 40 degrees F (4.4 degrees C).

2.10 THERMOSTATIC AIR VENTS

A. **Balanced Pressure Thermostatic Air Vents:**

1. **HP systems:** Ductile iron body, renewable stainless steel thermostatic bellows, seat, head, and internals. Minimum operating pressure of 300 psig (2070 kPa).
2. **LP systems:** Cast-iron or brass body, stainless steel balanced pressure thermostatic bellows, seat and internals. Maximum operating pressure of 125 psig (860 kPa).

2.11 VACUUM BREAKERS

A. **Vacuum Breakers:** 150-psig (1035-kPa) steam working pressure, 365 deg F maximum operating temperature, brass or stainless-steel body, and stainless-steel retainer, spring, and ball; with plain or threaded outlet.

2.12 STRAINERS

A. **Y-Pattern Strainers:**

1. **LP systems:** 250-psig (1725-kPa) working steam pressure; ASTM A 126, Class B cast-iron body; stainless-steel screen, No. 20 mesh for NPS 2 (DN 50) and smaller and manufacturer's recommended perforations for NPS 2-1/2 (DN 65) and larger; tapped blowoff plug. Threaded connections for strainers NPS 2 (DN 50) and smaller and flanged connections for strainers NPS 2-1/2 (DN 65) and larger.
2. **HP systems:** 600 psig (4140 kPa) working steam pressure, ASTM A216 cast-steel body; stainless-steel screen, No. 20 mesh for NPS 2 (DN 50) and smaller and manufacturer’s recommended perforations for NPS 2-1/2 (DN 65) and larger; tapped steel cap. Threaded connections for strainers NPS 2 (DN 50) and smaller and flanged connections for strainers NPS 2-1/2 (DN 65) and larger.

B. **Basket Strainers:** 250-psig (1725-kPa) working steam pressure; ASTM A 126, Class B cast-iron body; stainless-steel screen; bolted cover; threaded connections for strainers NPS 2 (DN 50) and smaller and flanged connections for strainers NPS 2-1/2 (DN 65) and larger.

2.13 FLASH TANKS

A. **Shop or factory fabricated** of welded steel according to the ASME Boiler and Pressure Vessel Code, for 150-psig (1035-kPa) rating; and bearing ASME label. Fabricate with tappings for vents, low-pressure steam and condensate outlets, high-pressure condensate inlet, air vent, safety valve, and legs.

2.14 NOISE ATTENUATORS

A. **Noise Suppressors:** HP noise suppressors, straight through configuration, dissipate-reactive type suitable for 15 dBA steam noise reduction downstream of pressure-reducing valve. Welded carbon steel cylindrical body with concentric reducer transitions, Type 302 stainless steel acoustic interior, ANSI Class 300 raised-face flanged connections, and NPS 0.75 (DN 20) threaded drain connection.

B. **Muffling Orifices:** HP noise muffling orifices, carbon steel plate with multiple primary orifices, Type 302 stainless steel plate with multiple secondary orifices welded onto primary plate, suitable for minimum 8 dBA steam noise reduction downstream of pressure-reducing valve and noise suppressor. Mount between ANSI Class 300 raised-face flanges.

C. **Noise Diffusers:** HP noise diffusers suitable for 15 dBA steam noise reduction downstream of safety valves reduces exit turbulence through orifice pattern in nozzle configuration. Welded and rolled carbon steel construction with ANSI Class 300 raised-face flanged connections.

2.15 ELECTRIC-DRIVEN STEAM CONDENSATE PUMPS

A. **Description:** Factory-fabricated, packaged, electric-driven pumps; with receiver, pump(s), controls, and accessories suitable for operation with steam condensate.

B. **Configuration:** Duplex floor-mounting pumps with receiver and float switches; rated to 210 deg F (99 deg C) steam condensate.

1. **Receiver:** Floor-mounting, close-grained cast iron or welded steel; externally adjustable float switches; with water-level gage, separate float switch for high-level alarm, steam condensate thermometer, discharge-pressure gage for each pump, bronze gate valves between receiver and pumps, flanges for pump mounting, and lifting eyebolts.
2. **Inlet Strainer:** Cast iron with self-cleaning bronze screen, dirt pocket, and cleanout plug on receiver inlet.
3. **Pumps:** Centrifugal, close coupled, vertical design, permanently aligned, and bronze fitted; with replaceable bronze case rings, stainless-steel shafts, and mechanical seals; mounted on receiver flanges[; rated to operate with a minimum of 2 feet (6 kPa) of NPSH.

4. **Control Panel:** NEMA 250, Type 2 enclosure with hinged door and grounding lug, mounted on pump; factory wired for single external electrical connection; and with the following components within cabinet:

   a. Motor controller for each pump.
   b. Electrical pump alternator to operate pumps in lead-lag sequence and allow both pumps to operate on receiver high level.
   c. Manual lead-lag control to override electrical pump alternator to manually select the lead pump.
   d. Momentary contact "TEST" push button on cover for each pump.
   e. Numbered terminal strip.
   f. Disconnect switch.
   g. Fused transformer for control circuit.
   h. Automatic and Off selection switches.
   I. High-level alarm.

5. **Capacities and Characteristics:** Provide units with capacities and electrical characteristics indicated on the drawings.

C. **Configuration:** Duplex floor-mounting pump with elevated receiver, float switches, and connecting piping; rated to pump 212 deg F (100 deg C) steam condensate.

1. **Receiver:** Welded steel, mounted on fabricated-steel supports; externally adjustable float switches; with water-level gage, steam condensate thermometer, pump discharge pressure gages, bronze isolation valves between receiver and pumps, and lifting eyebolts.
2. **Inlet Strainer:** Cast iron with self-cleaning bronze screen, dirt pocket, and cleanout plug on receiver inlet.
3. **Pumps:** Centrifugal, close coupled, permanently aligned, and bronze fitted; with replaceable bronze case rings, stainless-steel shafts, and mechanical seals rated for 250 deg F (121 deg C); mounted on base below receiver; rated to operate with a minimum of 2 feet (6 kPa) of NPSH.
4. **Control Panel:** NEMA 250, Type 2 enclosure with hinged door and grounding lug; mounted on pump; factory wired for single external electrical connection; and with the following components within cabinet:

   a. Motor controller for each pump.
   b. Electrical pump alternator to operate pumps in lead-lag sequence and allow both c. pumps to operate on receiver high level.
   d. Manual lead-lag control to override electrical alternator to manually select the lead pump.
   e. Momentary contact "TEST" push button on cover for each pump.
   f. Numbered terminal strip.
   g. Disconnect switch.
   h. Fused transformer for control circuit.

D. **Configuration:** Underground duplex pump with basin and float switches; rated to pump 200 deg F (93 deg C) steam condensate.

1. **Basin:** Cast iron, with hub-type inlets.
2. **Basin Cover:** Cast iron or steel with gasketed openings for access, pumps, pump shafts, control rods, discharge piping, and vent connections.

   a. *Anchor Flange:* Cast iron, attached to basin, in location and of size required to anchor basin to concrete slab.

3. **Pumps:** Wet-pit mounted, vertical, flexible coupled, and suspended.

   a. *Casing:* Cast iron with open inlet.
   b. *Shaft and Bearings:* Stainless-steel shaft with oil-lubricated, bronze, intermediate sleeve bearings; 48-inch (1200-mm) maximum intervals where basin depth is more than 48 inches (1200 mm); and grease-lubricated, ball-type, thrust bearings.
   c. *Shaft Couplings:* Flexible, capable of absorbing vibration.
   d. *Seals:* Mechanical; with carbon rotating ring, bearing on a ceramic seat held by a stainless-steel spring, and enclosed by a flexible bellows and gasket.
   e. *Motors:* Vertically mounted on cast-iron pedestal.
   f. *Pump Discharge Piping:* Manufacturer's standard steel or bronze pipe, unless otherwise indicated.

E. **Control Panel:** NEMA 250, Type 2 enclosure with hinged door and grounding lug; mounted on pump; factory wired for single external electrical connection; and with the following components within cabinet:

1. **Motor controller** for each pump.
2. **Electrical pump alternator** to operate pumps in lead-lag sequence and allow both pumps to operate on receiver high level.
3. **Manual lead-lag** control to override electrical alternator to manually select the lead pump.
4. **Momentary contact** "TEST" push button on cover for each pump.
5. **Numbered** terminal strip.
6. **Disconnect** switch.
7. **Fused** transformer for control circuit.

2.16 DUCTS - SHEET METAL MATERIALS

A. **Comply with SMACNA's** "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. **Galvanized Sheet Steel:** Lock-forming quality; complying with ASTM A 653/A 653M and having G90 (Z275) coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. **Reinforcement Shapes and Plates:** Galvanized-steel reinforcement where installed on galvanized sheet metal ducts, carbon steel on carbon-steel ducts, aluminum on aluminum ducts, stainless steel on stainless-steel ducts.

D. **Tie Rods:** Galvanized, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

E. **Sealants:** Seal all ducts with water-based joint seam sealant. Select products based on SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

2.17 DUCT LINER

A. **Fibrous-Glass Liner:** Comply with NFPA 90A or NFPA 90B.

1. **Materials:** ASTM C 1071; Type 1, surfaces exposed to airstream shall be coated to prevent erosion of glass fibers.
   a. *Thickness:* 1 inch. ASTM C423, Noise reduction coefficient (NRC) at least 0.60 per inch.
   b. *Thermal Conductivity (k-Value):* 0.26 at 75 deg F (0.037 at 24 deg C) mean temperature. Nominal 2 lbs per cu. ft. (32 kg per cu. m) density.
   c. *Facing:* Black composite sprayed-on surface, recommended by manufacturer to prevent particles from penetrating the fiberglass, and to be cleaned by vacuum or dusting.
   d. *Resistance to microbial growth:* Tested and shown to support no growth of:
      1) Fungi in accordance with ASTM G 21.
      2) Bacteria in accordance with ASTM G 22.
   e. *Fire-Hazard Classification:* Maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
   f. *Liner Adhesive:* Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
   g. *Mechanical Fasteners:* Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in duct.
      1) Adhesive for Attaching Mechanical Fasteners: Comply with fire-hazard classification of duct liner system.

2.18 RECTANGULAR DUCT FABRICATION

A. **Fabricate ducts**, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals for pressure classes specified in this section.

1. **Lengths:** Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.

2. **Deflection:** Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. **Transverse Joints:** Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, and joint reinforcement. Joint types shall ensure compliance with leakage limits specified in Part 3 below.

C. **Liner Application:** Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.

2.19 DUCT ACCESSORIES

A. **Volume Dampers:** Factory fabricated and suitable for horizontal or vertical applications, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.

1. **Frame and Blades:** 0.064-inch- (1.62-mm-) thick, galvanized sheet steel..
2. **Jackshaft:** 1-inch- (25-mm-) diameter, galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. **Damper Hardware:** Zinc-plated, die-cast core with dial and handle made of 3/32-inch- (2.4-mm-) thick zinc-plated steel, and a 3/4-inch (19-mm) hexagon locking nut. Include center hole to suit damper operating-rod size. Include extended platform for insulated duct mounting.

B. **Fire Dampers:** Fire dampers shall be labeled according to UL 555 for dynamic systems.

1. **Frame and Blades:** Roll-formed, interlocking, 0.028-inch- (0.85-mm-) thick, galvanized sheet steel.
2. **Vertical and horizontal dampers:** Include stainless-steel closure spring. Include blade lock for vertical units.
3. **Motorized fire dampers:** Rated and labeled under UL 555 and 555S, with leakage no higher than Class II (10 cfm per square foot at 1.0 inch water gage) and fire-rated at 1.5 hours.
   a. *Include sensors and controls* which mechanically and electrically lock damper closed when duct temperatures exceed 212 degrees F, but allow damper to be reopened and operated from remote control panel. Includes damper position indicator switches linked to the remote control panel, indicating open and closed positions.
   b. *Include temperature sensor* which returns dampers to fire protection mode when temperatures exceed 250 degrees F (121 degrees C).

c. Equip each damper section with an electric or pneumatic actuator, as an integral part of the damper assembly. Include electro-pneumatic (EP) switch with pneumatic actuator, connected with high temperature tubing.

C. **Combination Fire and Smoke Dampers:** Labeled according to UL 555 for 1-1/2-hour rating. Smoke dampers only do not require fire rating.

1. **Frame and Blades:** 0.064-inch- (1.62-mm-) thick, galvanized sheet steel. Double-skin airfoil-shaped blades, with minimum pressure loss of less than 0.1 inch wg in open position at average duct velocity of 2500 fpm.
2. **Leakage in accordance** with UL Standard 555S no higher than Class I (4 cfm per square foot at one inch wg).
3. **Operator:** Elevated temperature category B (250 degrees F (121 degrees C)) damper operator, electric or pneumatic as required by control system, factory-installed on exterior of sleeve and properly linked to damped operating shaft.

D. **Backdraft Dampers:** Multiple-blade, parallel action gravity balanced, with galvanized steel blades of maximum 6-inch width, with neoprene sealed edges, assembled in rattle-free manner with 90-degree stop, steel ball bearings, and axles; adjustment device to permit setting for varying differential static pressure.

E. **Duct-mounting Access Doors**:

1. **Airtight double-wall doors** with duct mounting, and fabricated of minimum 24 gauge galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Include continuous piano hinge and cam latches.

a. *Frame:* Galvanized sheet steel, with bend-over tabs and neoprene or foam gaskets.
b. *Provide number* of cam latches as follows:

1. Up to 18 Inches (450 mm) Square: Two cam latches.
2. Up to 24 by 48 Inches (600 by 1200 mm): Two compression latches with outside and inside handles.
3. Sizes 24 by 48 Inches (600 by 1200 mm) and Larger: Two compression latches with outside and inside handles.

F. **Duct Accessory Adhesives:** High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

2.20 INTEGRAL-DIFFUSER AIR TERMINAL UNITS

A. **Diffuser:** Galvanized-steel insulated plenum with extruded-aluminum or sheet-steel diffuser, having fixed or variable geometry designed to operate from 100 percent to minimum airflow, manual adjustment of airflow direction, and white baked-enamel finish.

B. **Configuration:** Volume-damper assembly inside unit casing with integral diffuser; configuration to match existing diffusers in adjacent spaces or building standard.

C. **Finish:** Color and finish to match existing diffusers in work area.

PART 3 - EXECUTION

3.1 HYDRONIC PIPING INSTALLATIONS

A. **Install groups** of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

B. **Install drains**, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

C. **Install piping** at a uniform grade of 0.2 percent upward in direction of flow.

D. **Reduce pipe sizes** using eccentric reducer fitting installed with level side up.

E. **Unless otherwise indicated**, install branch connections to mains using tee fittings in main pipe, with the takeoff coming out the bottom of the main pipe. For up-feed risers, install the takeoff coming out the top of the main pipe.

F. **Install strainers** on supply side of each control valve, pressure-reducing valve, solenoid valve, in-line pump, and elsewhere as indicated. Install NPS 3/4 (DN 20) nipple and ball valve in blowdown connection of strainers NPS 2 (DN 50) and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2 (DN 50).

G. **Anchor piping** for proper direction of expansion and contraction.

H. **Provide dielectric unions** between steel and copper pipe.

3.2 LP STEAM PIPING APPLICATIONS

A. **For LP Steam Piping,** refer to article 2.6-A of this section.

B. **Condensate Piping, NPS 2 (DN 50) and Smaller:** Schedule 80 steel pipe, with threaded joints using Class 125 malleable-iron fittings.

C. **Condensate Piping, NPS 2-1/2 through NPS 12 (DN 65 through DN 200):** Schedule 80 steel pipe, with welded joints using Schedule 80 wrought-steel welding fittings and Class 150 wrought-steel flanges.

D. **Condensate Piping, NPS 10 through NPS 20 (DN 250 through DN 500):** Schedule XS steel pipe, with welded joints using Schedule XS wrought-steel welding fittings and Class 150 wrought-steel flanges.

3.3 HP STEAM PIPING APPLICATIONS

A **For HP Steam Piping,** refer to article 2.6-B of this section.

B. **Condensate Piping, NPS 2 (DN 50) and Smaller:** Schedule 80 steel pipe, with threaded joints using Class 300 malleable-iron fittings.

C. **Condensate Piping, NPS 2-1/2 through NPS 8 (DN 65 through DN 200):** Schedule 80 steel pipe, with welded joints using Schedule 80 wrought-steel welding fittings and Class 300 wrought-steel flanges.

D. **Condensate Piping NPS 10 through NPS 20 (DN 250 through DN 500):** Schedule XS steel pipe, with welded joints using Schedule XS wrought-steel welding fittings and Class 300 wrought-steel flanges.

3.4 VALVE APPLICATIONS

A. **General-Duty Valve Applications:** Unless otherwise indicated, use the following valve types:

1. **Shutoff Duty:** Gate valves.
2. **Throttling Duty:** Globe valves.

B. **Install shutoff-duty valves** at each branch connection to supply mains, at inlet connection to each steam trap, and elsewhere as indicated.

3.5 STEAM AND CONDENSATE PIPING INSTALLATIONS

A. **Cast iron** is not permitted on high pressure (HP) steam and condensate systems.

B. **Install groups of pipes** parallel to each other, spaced to permit applying insulation and servicing of valves.

C. **Install drains**, consisting of a tee fitting, NPS 3/4 (DN 20) gate valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

D. **Install steam supply piping** at a uniform grade of 0.2 percent downward in direction of steam flow.

E. **Install condensate** return piping at a uniform grade of 0.4 percent downward in direction of condensate flow.

F. **Reduce pipe sizes** using eccentric reducer fitting installed with level side down.

G. **Unless otherwise indicated**, install branch connections to steam mains using 45-degree fittings in main pipe, with the takeoff coming out the top of the main pipe. Use of 90-degree tee fittings is permissible if 45-degree fittings are impractical. If length of branch takeoff is less than 10 feet (3 m), pitch branch line down toward mains at a 0.4 percent grade.

H. **Install** long radius type elbows in piping NPS 4 (DN 100) and larger.

I. **Install unions** in piping NPS 2 (DN 50) and smaller adjacent to each valve, at final connections of each piece of equipment.

J. **Install flanges** in piping NPS 2-1/2 (DN 65) and larger at final connections of each piece of equipment.

K. **Install strainers** on supply side of each control valve, pressure-reducing valve, solenoid valve, traps, and elsewhere as indicated. Install NPS 3/4 (DN 20) nipple and gate valve in blowdown connection of strainers NPS 2 (DN 50) and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2 (DN 50).

L. **Anchor piping** for proper direction of expansion and contraction

M. **Install drip legs** at low points and natural drainage points such as ends of mains, bottoms of risers, and ahead of pressure regulators, control valves, isolation valves, pipe bends, and expansion joints.

1. **On straight runs** with no natural drainage points, install drip legs at intervals not exceeding 300 feet (90 m) where pipe is pitched down in direction of steam flow and a maximum of 150 feet (45 m) where pipe is pitched up in direction of steam flow.
2. **Size drip legs** at vertical risers same size as pipe and extend beyond rise. Size drip legs at other locations same diameter as main. In steam mains NPS 6 (DN 150) and larger, dirt leg size can be reduced, but to no less than NPS 4 (DN 100).
3. **Install gate valve** at drip legs, dirt pockets, and strainer blowdowns to allow removal of dirt and scale.
4. **Install** steam traps close to drip legs.

3.6 STEAM-TRAP INSTALLATION

A. **Install steam traps** in accessible locations as close as possible to connected equipment, but not more than 48 inches (1200 mm) from connected equipment.

1. Unless otherwise indicated, install gate valve, strainer, and union upstream from trap; install union, check valve, and gate valve downstream from trap.

3.7 SAFETY VALVE INSTALLATIONS

A. **Install safety valves** according to ASME B31.1. Pipe safety valve discharge without valves to atmosphere outside building. Install drip-pan elbow fitting adjacent to safety valve and pipe drain connection to nearest floor drain. Install cable, pulleys, and tee handle to open or test safety valve levers from floor level.

3.8 HANGERS AND SUPPORTS

A. **Piping support** must account for expansion and contraction, vibration, and dead load of piping and its contents, and bracing requirements.

B. **Install the following pipe** attachments for hydronic piping:

1. **Adjustable steel** clevis hangers MSS SP-58 Type 1 for individual horizontal piping.

   a. *Hot systems:* Piping lengths less than 20 feet long.
   b. *Ambient and cold systems:* All piping lengths and pipe sizes.

2. **Adjustable roller hangers** MSS SP-58 Type 43 and spring hangers for individual horizontal piping. Hot system piping lengths 20 feet or longer.
3. **Pipe Roller:** MSS SP-58, Type 44 for multiple horizontal piping, supported on a trapeze. Hot system piping lengths 20 feet or longer.
4. **Spring hangers** to support vertical runs.

C. **Install hangers** for steel piping with the following maximum spacing and minimum rod sizes. In many instances, steam and condensate piping spacing may be greater; any variations from the listed requirements must be approved by the AOC prior to construction:

1. **NPS 3/4 (DN 20):** Maximum span, 7 feet; minimum rod size, 1/4 inch.
2. **NPS 1 (DN 25):** Maximum span, 7 feet; minimum rod size, 1/4 inch.
3. **NPS 1-1/2 (DN 40):** Maximum span, 9 feet; minimum rod size, 3/8 inch.
4. **NPS 2 (DN 50):** Maximum span, 10 feet; minimum rod size, 3/8 inch.
5. **NPS 2-1/2 (DN 65):** Maximum span, 11 feet; minimum rod size, 3/8 inch .
6. **NPS 3 (DN 80):** Maximum span, 12 feet; minimum rod size, 3/8 inch.
7. **NPS 4 (DN 100):** Maximum span, 14 feet; minimum rod size, ½ inch.
8. **NPS 6 (DN 150):** Maximum span, 17 feet; minimum rod size, ½ inch.
9. **NPS 8 (DN 200):** Maximum span, 19 feet; minimum rod size, 5/8 inch.
10. **NPS 10 (DN 250):** Maximum span, 20 feet; minimum rod size, 3/4 inch.
11. **NPS 12 (DN 300):** Maximum span, 23 feet; minimum rod size, 7/8 inch.
12. **NPS 14 (DN 350):** Maximum span, 25 feet; minimum rod size, 1 inch.
13. **NPS 16 (DN 400):** Maximum span, 27 feet; minimum rod size, 1 inch.
14. **NPS 18 (DN 450):** Maximum span, 28 feet; minimum rod size, 1-1/4 inches.

D. **Install hangers** for drawn-temper copper piping with the following maximum spacing and

minimum rod sizes:

1. **NPS 3/4 (DN 20):** Maximum span, 5 feet; minimum rod size, 1/4 inch.
2. **NPS 1 (DN 25):** Maximum span, 6 feet; minimum rod size, 1/4 inch.
3. **NPS 1-1/2 (DN 40):** Maximum span, 8 feet; minimum rod size, 3/8 inch.
4. **NPS 2 (DN 50):** Maximum span, 8 feet; minimum rod size, 3/8 inch.
5. **NPS 2-1/2 (DN 65):** Maximum span, 9 feet; minimum rod size, 3/8 inch.
6. **NPS 3 (DN 80):** Maximum span, 10 feet; minimum rod size, 3/8 inch.

E. **Support vertical runs** at roof, at each floor, and at 10-foot intervals between floors.

3.9 STEAM AND CONDENSATE PIPING - TERMINAL EQUIPMENT CONNECTIONS

A. **Size for supply and return** piping connections shall be same as for equipment connections. Branch pipe sizes shall be as shown on drawings.

B. **Install traps and control** valves in accessible locations close to connected equipment.

C. **Install bypass piping** with globe valve around control valve. If multiple, parallel control valves are installed, only one bypass is required.

D. **Install vacuum breaker** downstream from control valve and bypass and close to coil inlet connection.

E. **Install ports** for pressure and temperature gages at coil inlet connections.

F. **Install a drip leg** at coil outlet.

3.10 FIELD QUALITY CONTROL

A. **Prepare piping** according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush system with clean water. Clean strainers.
4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
5. Install safety valve, set at a pressure no more than ten percent higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

B. **Perform the following tests** on hydronic piping according to ASME B31.9 Hydrostatic Leak Testing, and as follows:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
2. While filling system, use vents installed at high points of system to release trapped air. Use drains installed at low points for complete draining of liquid.
3. Check expansion tanks to determine that they are not air bound and that system is full of water.
4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the design pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed either 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A of ASME B31.9, "Building Services Piping."
5. After hydrostatic test pressure has been applied for at least 60 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
6. Prepare written report of testing.

3.11 CONCRETE BASES

A. **Install dowel rods** to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around full perimeter of base.

B. **For supported equipment**, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.

C. **Place and secure** anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

D. **Install anchor bolts** to elevations required for proper attachment to supported equipment.

3.12 PIPING SYSTEMS ADJUSTING

A. **Mark calibrated nameplates** of pump discharge valves after hydronic system balancing has been completed, to permanently indicate final balanced position.

B. **Perform these adjustments** before operating the system:

1. Open valves to fully open position. Close coil bypass valves.
2. Check pump for proper direction of rotation.
3. Set automatic fill valves for required system pressure.
4. Check air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
5. Set temperature controls so all coils are calling for full flow.
6. Check operation of automatic bypass valves.
7. Check and set operating temperatures of boilers, chillers, and cooling towers to design

requirements.

8. Lubricate motors and bearings.

3.13 PUMP INSTALLATION

A. **Install pumps** according to HI 1.1-1.5, "Centrifugal Pumps for Nomenclature, Definitions, Application and Operation."

B. **Install pumps** with access for periodic maintenance including removal of motors, impellers, couplings, and accessories.

C. **Independently support pumps** and piping so weight of piping is not supported by pumps and weight of pumps is not supported by piping.

D. **Suspend vertically mounted**, in-line centrifugal pumps independent of piping. Install pumps with motor and pump shafts vertical.

3.14 PUMP DEMONSTRATION

A. **Engage** a factory-authorized service representative to train AOC maintenance personnel to adjust, operate, and maintain pumps.

3.15 PIPING SYSTEMS CLEANING

A. **Flush piping systems** with clean water. Remove and clean or replace strainer screens. After cleaning and flushing piping systems, but before balancing, remove disposable fine-mesh strainers in pump suction diffusers.

3.16 DUCT INSTALLATION

A. **Construct and install ducts** and accessories according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.

B. **Install ducts** with fewest possible joints. Install fabricated fittings for changes in directions, size, and shape and for connections.

C. **Install couplings tight** to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches (300 mm), with a minimum of 3 screws in each coupling.

D. **Install ducts close** to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.

E. **Install ducts** with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.

F. **Seal all joints and seams**. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.

G. **Electrical Equipment Spaces:** Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.

H. **Non-Fire-Rated Partition Penetrations:** Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches.

I. **Fire-Rated Partition Penetrations:** Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant.

J. **Paint interiors of metal ducts**, that do not have duct liner, for 24 inches (600 mm) upstream of registers and grilles. Apply one coat of flat, black, latex finish coat over a compatible galvanized-steel primer.

K. **Support horizontal ducts** within 24 inches (600 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.

L. **Support vertical ducts** at maximum intervals of 16 feet (5 m) and at each floor.

M. **Install upper attachments** to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

N. **Install** the following minimum sizes for duct-mounting, rectangular access doors:

1. Head and Hand Access: 16 by 16 inches (406 by 406 mm).
2. Body Plus Ladder Access: 24 by 18 inches (607 by 455 mm).

O. **Clean all new and affected** existing duct systems and components by vacuuming prior to full-time operation. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet.

3.17 DUCT AIR LEAKAGE

A. **Testing requirements:** Perform the following field tests and inspections according to SMACNA's "HVAC Air Duct Leakage Test Manual" and prepare test reports:

B. **Perform duct air leakage testing** for the following air distribution systems:

1. Supply, return and exhaust ducts in heating and air conditioning systems.
2. Exhaust systems serving toilet rooms, janitors closets, storage rooms, etc.

END OF DIVISION TWENTY-THREE

DIVISION TWENTY-SIX - ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section** includes the following:

1. Building wires and cables rated 600 V and less
2. Raceways, fittings, boxes, enclosures, and cabinets for electrical wiring
3. Interior lighting fixtures, lamps, and ballasts

1.3 DEFINITIONS

A. **EMT:** Electrical metallic tubing.

B. **EPDM:** Ethylene-propylene-diene terpolymer rubber.

C. **FMC:** Flexible metal conduit.

D. **IMC:** Intermediate metallic conduit.

E. **LFMC:** Liquidtight flexible metal conduit.

F. **RMC:** Rigid metal conduit.

1.4 REFERENCED STANDARDS

A. Comply with NFPA 70.

1.5 SUBMITTALS

A. **Product Data:** For the following:

1. Each type of product indicated.
2. Each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

    a. Ballast.
    b. Energy-efficiency data.

c. Life, output, and energy-efficiency data for lamps.

B. **Coordination Drawings:** Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other: Lighting fixtures, Suspended ceiling components, Structural members, air outlets/inlets, and other items in finished ceiling.

1.6 QUALITY ASSURANCE

A. **For many applications**, more than one type of material specified may be used. Coordinate material selection with the AOC to ensure best quality as well as compatibility with existing systems.

B. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. **Comply with International Building (Electric) Code** and the National Electric Code NEC / NFPA-70.

1.7 COORDINATION

A. **Coordinate layout and installation** of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

B. **Electrical equipment** installed shall have no effect on the Legislative Call electronic signal system. **DO NOT USE ELECTRONIC BALLASTS FOR FLUORESCENT FIXTURES - USE HYBRID BALLAST AND T8 LAMPS.**

1.8 WARRANTY

A. **Special Warranty for T8 Fluorescent Lamps:** Manufacturer's standard form, made out to AOC and signed by lamp manufacturer agreeing to replace lamps that fail in materials or workmanship, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

a. **Warranty Period:** Two years from date of Substantial Completion.

B. **Ballast Warranty:** Manufacturer’s three-year warranty against defects in materials or workmanship, including replacement, for operation oat a maximum case temperature of 90 degrees C.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. **Wire and Cable:** Type THHN-THWN, conforming to UL 83.

1. Minimum wire size: #12.

B. **Copper Conductors and Insulation:** Comply with NEMA WC 70.

1. **Conductors No. 10 AWG** and smaller shall be solid, and No. 8 AWG and larger shall be stranded.
2. **Insulation** shall be cross-linked thermosetting polyethylene, flame retardant, and moisture resistant.

2.2 METAL CONDUIT AND TUBING

A. **Rigid Steel Conduit:** ANSI C80.1.

B. **PVC-Coated Steel Conduit:** PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch (1 mm), minimum.

C. **EMT:** ANSI C80.3.

D. **FMC:** Zinc-coated steel.

E. **IMC:** ANSI C80.6.

F. **LFMC:** Flexible steel conduit with PVC jacket.

G. **Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable:** NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. **Conduit Fittings for Hazardous (Classified) Locations:** Comply with UL 886.
2. **Fittings for EMT:** Steel.
3. **Coating for Fittings for PVC-Coated Conduit:** Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

2.3 NONMETALLIC CONDUIT AND TUBING

A. **RNC:** NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

2.4 BOXES, ENCLOSURES, AND CABINETS

A. **Outlet and Device Boxes and Covers:**

1. **Cadmium- or Zinc-Coated:** Comply with UL 514A
2. **Non-metallic:** Comply with UL 514C.
3. **In hazardous** (classified) locations, comply with UL 886.

B. **Cabinets:** NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

1. **Hinged door** in front cover with flush latch and concealed hinge.
2. **Key latch** to match panelboards.
3. **Metal barriers** to separate wiring of different systems and voltage.
4. **Accessory feet** where required for freestanding equipment.

2.5 SLEEVES FOR RACEWAYS

A. **Steel Pipe Sleeves:** ASTM A 53, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

1. **For underground** applications, use cast iron pipe sleeves, equivalent tot ductile iron pressure pipe with plain ends and integral waterstop.

B. **Coordinate sleeve selection** and application with selection and application of firestopping specified in Division 07 specification.

2.6 SLEEVE SEALS

A. **Description:** Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. **Sealing Elements:** EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. **Pressure Plates:** Stainless steel. Include two for each sealing element.
3. **Connecting Bolts and Nuts:** Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

A. **Recessed Fixtures:** Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. **Fluorescent Fixtures:** Comply with UL 1598.

C. **Plastic Diffusers, Covers, and Globes:**

1. **Acrylic Lighting Diffusers:** 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

   a. *Lens Thickness:* At least 0.125 inch minimum unless different thickness is indicated.
   b. *UV stabilized*.

D **Electrical equipment** installed shall have no effect on the Legislative Call electronic signal system.

2.8 BALLASTS FOR FLUORESCENT LAMPS

A. **Ballasts for Low Electromagnetic-Interference Environments:** Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for consumer equipment.

1. **Sole-Source Product (no equal products may be used):** ADVANCE hybrid Electromagnetic ballast, by PowrKut. Model RK-2S32-TP (120V) or VK-2S32-TP (277V).

   a. Ballast shall be rapid start, and contain auto-restart circuitry to restart lamps without resetting power.
   b. Ballast input shall have Total Harmonic Distortion (THD) of less than 15% when operated at nominal line voltage with primary lamp.
   c. Sound rating: Class A.

B. **Electronic Ballasts (<u>ONLY</u> for use in facilities and buildings without Legislative Call system):** Comply with ANSI C82.11; instant -start type, unless otherwise indicated, and designed for type and quantity of lamps served. Ballasts shall be designed for full light output unless dimmer or bi-level control is indicated.

1. Sound Rating: Class A.
2. Total Harmonic Distortion (THD): Less than 10%.

2.9 FLUORESCENT LAMPS

A. **Low-Mercury Lamps:** Comply with EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.

B. **T8 rapid-start low-mercury lamps**, rated 32 W maximum, nominal length of 48 inches (1220 mm), 2800 initial lumens (minimum), CRI 82 (minimum), color temperature 3500 K, and average rated life 20,000 hours, unless otherwise indicated.

C. **T8 rapid-start low-mercury lamps**, rated 17 W maximum, nominal length of 24 inches (610 mm), 1300 initial lumens (minimum), CRI 82 (minimum), color temperature 3500 K, and average rated life of 20,000 hours, unless otherwise indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR INSULATION AND WIRING METHODS

A. **All Feeders and Branch Circuits:** Type THHN-THWN, single conductors in raceway

3.2 INSTALLATION OF CONDUCTORS AND CABLES

A. **Conceal cables** in finished walls, ceilings, and floors, unless otherwise indicated.

B. **Use manufacturer-approved** pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. **Use pulling means**, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. **Identify and color-code** conductors and cables as follows:

1. **Emergency:** Red
2. **Isolated Grounding Receptacles:** Orange
3. **Special Purpose:** Brown
4. **Standard Receptacles:** Coordinate with architectural scheme. Use white for white or light gray walls.

3.3 CONNECTIONS

A. **Tighten electrical connectors** and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. **Make splices and taps** that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. **Wiring at Outlets:** Install conductor at each outlet, with at least 9 inches of slack.

3.4 RACEWAY APPLICATION

A. **Outdoors:** Apply raceway products as specified below, unless otherwise indicated:

(1) **Exposed Conduit:** Rigid steel conduit.
(2) **Concealed Conduit, Aboveground:** Rigid steel conduit.
(3) **Underground Conduit:** RNC, Type EPC-40-PVC, direct buried.
(4) **Boxes and Enclosures, Aboveground:** NEMA 250, Type 4, stainless steel in damp or wet locations.

B. **Comply** with the following indoor applications, unless otherwise indicated:

1. **Exposed, Not Subject to Physical Damage:** EMT.
2. **Exposed, Not Subject to Severe Physical Damage:** EMT.
3. **Exposed and Subject to Severe Physical Damage:** Rigid steel conduit. Includes raceways in the following locations:

   a. Loading dock.
   b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
   c. Mechanical or machine rooms.
   d. Attics.

4. **Concealed in Ceilings and Interior Walls and Partitions:** EMT.
5. **Damp or Wet Locations:** Rigid steel conduit.
6. **Boxes and Enclosures:** NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.

C. **Minimum Raceway Size:** 3/4-inch trade size.

D. **Raceway Fittings:** Compatible with raceways and suitable for use and location.

1. **Rigid and Intermediate Steel Conduit:** Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. **PVC Externally Coated, Rigid Steel Conduits:** Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

E. **Aluminum conduit** is not permitted.

3.5 RACEWAY INSTALLATION

A. **Comply with NECA 1** for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. **Keep raceways** at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. **Complete raceway** installation before starting conductor installation.

D. **Arrange stub-ups** so curved portions of bends are not visible above the finished slab.

E. **Install** no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

F. **Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions:** Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

G. **Install pull wires** in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

H. **Flexible Conduit Connections:** Use maximum of 72 inches (1830 mm) of compatible flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

I. **Recessed Boxes in Masonry Walls:** Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

J. **Set metal floor boxes** level and flush with finished floor surface.

K. **Set nonmetallic floor boxes level**. Trim after installation to fit flush with finished floor surface.

3.6 INSTALLATION OF UNDERGROUND CONDUIT

A **Direct-Buried Conduit:**

1. **Excavate trench bottom** to provide firm and uniform support for conduit. Prepare trench bottom for pipe less than 6 inches in nominal diameter.
2. **Install backfill**.
3. **After installing conduit**, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.
4. **Install** manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
    b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

5. **Warning Planks:** Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, placing them 24 inches (600 mm) o.c. Align planks along the width and along the centerline of conduit.

3.7 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. **Coordinate sleeve selection** and application with selection and application of firestopping specified in Division 07 Specification.

B. **Concrete Slabs and Walls:** Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of new slabs and walls.

C. **Fire-Rated Assemblies:** Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

D. **Cut sleeves** to length for mounting flush with both wall surfaces.

E. **Extend sleeves** installed in floors 2 inches (50 mm) above finished floor level.

F. **Size pipe sleeves** to provide 1/4-inch (6.4-mm) annular clear space between sleeve and cable unless sleeve seal is to be installed.

G. **Seal space outside** of exterior sleeves with grout for penetrations of concrete and masonry.

H. **Interior Penetrations of Non-Fire-Rated Walls and Floors:** Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint.

I. **Fire-Rated-Assembly Penetrations:** Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with approved firestop materials.

J. **Roof-Penetration Sleeves:** Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

K. **Above-ground Exterior-Wall Penetrations:** Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

L. **Underground Exterior-Wall Penetrations:** Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.8 SLEEVE-SEAL INSTALLATION

A. **Install** to seal underground exterior-wall penetrations.

B. **Use type and number** of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause

sealing elements to expand and make watertight seal.

3.9 FIRESTOPPING

A. **Apply firestopping** to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.10 PROTECTION

A. **Provide final protection** and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

3.11 LIGHT FIXTURE INSTALLATION

A. **Lighting fixtures:** Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

B. **Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings:** Comply with NFPA 70.

C. **Suspended Lighting Fixture Support:**

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.

D. **Adjust** aimable lighting fixtures to provide required light intensities.

E. **Connect** wiring.

END OF DIVISION TWENTY-SIX

CONTRACTOR ACCESS TO THE SENATE OFFICE BUILDINGS					
COMPANY:		**PHONE:**		**START DATE:**	
JOB SITE LOCATION:			**ARRIVAL TIME:**	**DEPARTURE TIME:**	
JOB DESCRIPTION:				**AOC CONTACT/PHONE:**	
				Primary point of Contact:	
VEHICLE INFORMATION:		**WORKERS ON SITE**		Secondary point of Contact:	
MAKE/MODEL:		**NAME:**		**SSN:**	
YEAR					
COLOR:					
TAG:					
VEHICLE INFORMATION (2)					
MAKE/MODEL:					
YEAR					
COLOR:					
TAG:					
VEHICLE INFORMATION (3)					
MAKE/MODEL:					
YEAR		David A. Douglas, Building Services Supervisor Senate Superintendent's Office, Building Services Center SDG-49			
COLOR:					
TAG:		**DATE:**			

Attachment 1: Employee and Vehicular Access Form

GENERAL DECISION: **DC20030003** 05/26/2006 DC3

Date: May 26, 2006
General Decision Number: **DC20030003** 05/26/2006

Superseded General Decision Number: DC020003

State: District of Columbia

Construction Type: Building

County: District of Columbia Statewide.

BUILDING CONSTRUCTION PROJECTS (Does not include single family homes and apartments up to and including 4 stories)

Modification Number	Publication Date
0	06/13/2003
1	10/03/2003
2	10/31/2003
3	01/09/2004
4	03/19/2004
5	04/02/2004
6	05/14/2004
7	06/11/2004
8	06/18/2004
9	06/25/2004
10	07/02/2004
11	07/09/2004
12	07/16/2004
13	08/13/2004
14	08/20/2004
15	09/17/2004
16	09/24/2004
17	10/29/2004
18	11/12/2004
19	01/21/2005
20	04/01/2005
21	05/06/2005
22	06/03/2005
23	06/10/2005
24	06/24/2005
25	07/01/2005
26	07/08/2005
27	07/22/2005
28	08/19/2005
29	08/26/2005
30	09/16/2005
31	10/28/2005
32	11/04/2005
33	11/11/2005
34	11/25/2005
35	02/03/2006
36	03/10/2006
37	05/05/2006
38	05/26/2006

ASBE0024-001 03/01/2006

	Rates	Fringes
Asbestos Worker/Heat and Frost Insulator Includes the application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.....	$ 25.88	12.88

ASBE0024-002 03/01/2006

	Rates	Fringes
Hazardous Material Handler Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems.....	$ 14.22	6.35

ASBE0024-005 03/01/2006

	Rates	Fringes
Fire Stop Technician Includes the application of materials or devices within or around penetrations and openings in all rated wall or floor assemblies, in order to prevent the passage of fire, smoke or other gases. The application includes all components involved in,creating the rated barrier at perimeter slab edges and exterior cavities, the head of gypsum board or concrete walls, joints between rated wall or floor components, sealing of penetrating items and blank openings.....	$ 20.94	6.09

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* BRDC0001-001 04/30/2006

	Rates	Fringes
Bricklayer.....	$ 25.90	6.19

CARP0132-006 05/01/2005

	Rates	Fringes
Carpenter (Including Drywall Hanging)	$ 22.89	5.39
Piledriver	$ 21.47	5.81

ELEC0026-003 09/02/2002

	Rates	Fringes
Communication Technician	$ 20.60	5.09

SCOPE OF WORK: Includes low voltage construction, installation, maintenance and removal of teledata facilities (voice, data and video) including outside plant, telephone and data inside wire, interconnect, terminal equipment, central offices, PABX, fiber optic cable and equipment, railroad communications, micro waves, VSAT, bypass, CATV, WAN (Wide area networks), LAN (Local area networks) and ISDN (Integrated systems digital network).

WORK EXCLUDED: The installation of computer systems in industrial applications such as assembly lines, robotics and computer controller manufacturing systems. The installation of conduit and/or raceways shall be installed by Inside Wiremen. On sites where there is no Inside Wireman employed, the Teledata Technician may install raceway or conduit not greater than 10 feet. Fire alarm work is excluded on all new construction sites or wherever the fire alarm system is installed in conduit. All HVAC control work.

ELEC0026-016 11/07/2005

	Rates	Fringes
Electrician (Excluding Communication-Low Voltage Wiring)	$ 30.45	10.35+3%+a

a. PAID HOLIDAYS: New Year's Day, Martin Luther King Jr.'s Birthday, Inauguration Day, Memorial Day, Fourth of July, Labor Day, Veterans Day, Thanksgiving Day, the day after Thanksgiving and Christmas Day or days designated as legal holidays by the Federal Government.

ENGI0077-009 05/01/2006

	Rates	Fringes
Power equipment operators:		
Boom Trucks	$ 25.52	6.42+a
Cranes (35 tons and above)	$ 26.69	6.42+a+b
Cranes (under 35 tons)	$ 26.23	6.42+a+b
Forklifts	$ 18.95	6.42+a
Piledrivers	$ 26.23	6.42+a

a. PAID HOLIDAYS:
New Years Day, Inaugural Day, Decoration Day, Independence Day, Labor Day, Martin Luther King's Birthday, Veterans

Day, Thanksgiving Day, Friday after Thanksgiving and Christmas Day.

b. PREMIUM PAY:
Tower cranes and cranes 100-ton and over to receive $1.00 per hour premium over Group One.

IRON0005-001 06/01/2005

	Rates	Fringes
Ironworkers:		
Structural, Ornamental and Chain Link Fence	$ 24.53	10.795

IRON0201-003 05/01/2005

	Rates	Fringes
Ironworker, Reinforcing	$ 24.45	9.73

LABO0074-001 06/01/2005

	Rates	Fringes
Laborer: Skilled	$ 18.03	3.12

FOOTNOTE: Potmen, power tool operator, small machine operator, concrete labor including concrete preparation, signalmen, laser beam operator, waterproofer, open caisson, test pit, underpinning, pier hole and ditches, laggers and all work associated with lagging that is not expressly stated, strippers, operator of hand derricks, vibrator operators, pipelayers, or tile layers, operators of jackhammers, paving breakers, spaders or any machine that does the same general type of work, scaffold builders, operators of towmasters, scootcretes, buggymobiles and other machines of similar character, operators of tampers and rammers, and other machines that do the same general type of work, whether powered by air, electric or gasoline builders of trestle scaffolds over one tier high and sand blasters, power and chain saw operators used in clearing, installers of well points, wagon drill operators, acetylene burners and licensed powdermen.

LABO0456-012 06/01/2005

	Rates	Fringes
Laborers:		
Mason Tenders (Brick)	$ 13.75	3.12
Mortarmen, Scaffold Builders	$ 14.45	3.12

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* MARB0002-002 05/01/2006

	Rates	Fringes
Marble & Stone Mason	$ 29.87	11.15

INCLUDES pointing, caulking and cleaning of All types of masonry, brick, stone and cement structures; EXCEPT pointing, caulking and cleaning of exisiting masonry, brick, stone and cement (restoration work)

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* MARB0003-001 05/01/2006

	Rates	Fringes
Mosaic & Terrazzo Worker, Tile Layer		
Marble Mason and Tile Layer	$ 24.32	8.78
Terrazzo Worker	$ 25.07	8.78

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* MARB0003-004 05/01/2006

	Rates	Fringes
Marble, Tile & Terrazzo Finisher	$ 19.59	7.90

PAIN0051-004 06/01/2005

	Rates	Fringes
Glazier		
Contracts $2,000,000 and under	$ 21.87	7.21
Contracts over $2,000,000	$ 23.09	7.21

PAIN0051-010 06/01/2005

	Rates	Fringes
Painters:		
Brush, Roller, Spray and Drywall Finishers	$ 21.31	7.06

PLAS0891-003 05/01/2004

	Rates	Fringes
Cement Mason	$ 23.73	4.945

PLUM0005-007 08/01/2005

	Rates	Fringes
Plumber		
Apartment Buildings over 4 stories (except hotels)	$ 19.86	7.56+a
ALL Other Work	$ 31.05	11.26+a

a. PAID HOLIDAYS: Labor Day, Veterans' Day, Thanksgiving Day and the day after Thanksgiving, Christmas Day, New Year's Day, Martin Luther King's Birthday, Memorial Day and the Fourth of July.

PLUM0602-006 08/01/2005

	Rates	Fringes
Steamfitter, Refrigeration & Air Conditioning Mechanic (Including HVAC Pipe Work).....	$ 30.27	12.02+a

a. PAID HOLIDAYS:
New Year's Day, Martin Luther King's Birthday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and the day after Thanksgiving Day and Christmas Day.

SFDC0669-001 04/01/2006

	Rates	Fringes
Sprinkler Fitter.....	$ 27.45	12.15

SHEE0100-002 07/01/2005

	Rates	Fringes
Sheet Metal Worker (Including HVAC Duct Work).....	$ 29.18	10.51

SUDC2000-001 04/12/2000

	Rates	Fringes
Laborer, Unskilled.....	$ 11.83	2.23
Pointer, caulker and cleaner INCLUDES pointing, caulking and cleaning of existing masonry, brick, stone and cement structures (restoration work); EXCLUDES pointing, caulking and cleaning of new or replacement masonry, brick, stone and cement.....	$ 20.00	

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

GENERAL DECISION: **VA20030037** VA37

Date: June 13, 2003
General Decision Number: **VA20030037**

Superseded General Decision No. VA020037

State: Virginia

Construction Type:
BUILDING

County(ies):
CLARKE FAUQUIER
CULPEPER WARREN

BUILDING CONSTRUCTION PROJECTS (Does not include single family homes and apartments up to and including 4 stories)

Modification Number	Publication Date
0	06/13/2003

COUNTY(ies):
CLARKE FAUQUIER
CULPEPER WARREN

SUVA1065A 08/26/1994

	Rates	Fringes
BRICKLAYERS	14.94	
CARPENTERS (Excluding Drywall Hanging, Acoustical Ceiling Installation and Batt Insulation)	11.64	
DRYWALL FINISHERS	11.07	
DRYWALL HANGERS	10.28	
ELECTRICIANS	11.35	
IRONWORKERS, STRUCTURAL	10.00	2.50
LABORERS:		
Unskilled	7.54	
Mason Tenders, Brick	7.66	
PAINTERS (Excluding Drywall Finishing)	10.00	
PLUMBERS (Including HVAC Work)	10.50	.53
POWER EQUIPMENT OPERATORS:		
Loaders	11.44	
ROOFERS	12.22	1.79
SHEET METAL WORKERS	11.40	.97

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations

indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination

* a survey underlying a wage determination
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* a conformance (additional classification and rate) ruling

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Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

GENERAL DECISION: **MD20030021** 03/10/2006 MD21

Date: March 10, 2006
General Decision Number: **MD20030021** 03/10/2006

Superseded General Decision Number: MD020021

State: Maryland

Construction Type: Building

County: Anne Arundel County in Maryland.

*EXCLUDING THE D.C. TRAINING SCHOOL BUILDING CONSTRUCTION PROJECTS (Does not include single family homes and apartments up to and including 4 stories)

Modification Number	Publication Date
0	06/13/2003
1	04/02/2004
2	05/14/2004
3	05/21/2004
4	06/04/2004
5	06/25/2004
6	10/22/2004
7	10/29/2004
8	01/21/2005
9	04/01/2005
10	06/03/2005
11	07/01/2005
12	07/08/2005
13	09/16/2005
14	10/28/2005
15	11/04/2005
16	11/18/2005
17	11/25/2005
18	02/17/2006
19	03/10/2006

* ASBE0024-001 03/01/2006

	Rates	Fringes
Asbestos Worker/Heat and Frost Insulator Includes the application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.....	$ 25.88	12.88

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* ASBE0024-002 03/01/2006

	Rates	Fringes
Hazardous Material Handler Includes preparation, wetting, stripping,		

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     removal, scrapping,
     vacuuming, bagging and
     disposing of all
     insulation materials,
     whether they contain
     asbestos or not, from
     mechanical systems.........$ 14.22            6.35
-----------------------------------------------------------------
* ASBE0024-005 03/01/2006

                                   Rates          Fringes

  Fire Stop Technician
     Includes the application
     of materials or devices
     within or around
     penetrations and openings
     in all rated wall or floor
     assemblies, in order to
     prevent the passage of
     fire, smoke or other
     gases. The application
     includes all components
     involved in creating the
     rated barrier at perimeter
     slab edges and exterior
     cavities, the head of
     gypsum board or concrete
     walls, joints between
     rated wall or floor
     components, sealing of
     penetrating items and
     blank openings.............$ 20.94            6.09
-----------------------------------------------------------------
* BOIL0193-001 01/01/2006

                                   Rates          Fringes

  Boilermaker...................$ 32.06           16.46
-----------------------------------------------------------------
BRMD0001-006 05/01/2005

                                   Rates          Fringes

  Tile Setter...................$ 22.58            5.20
-----------------------------------------------------------------
* ELEC0024-001 05/29/2005

                                   Rates          Fringes

  Electrician...................$ 27.70         11.15+3%
-----------------------------------------------------------------
IRON0016-006 04/01/2003

                                   Rates          Fringes

  Glazier.......................$ 23.78           11.56
  Ironworker, Structural........$ 23.78           11.56
-----------------------------------------------------------------
PLAS0891-003 05/01/2004
```

	Rates	Fringes
Cement Mason	$ 23.73	4.945

PLUM0486-001 04/01/2005

	Rates	Fringes
Plumber and Steamfitter	$ 29.12	12.15

ROOF0030-012 05/01/2005

	Rates	Fringes
Roofers: (Remainder of Area)	$ 22.35	7.21

ROOF0030-017 08/01/2005

	Rates	Fringes
Roofers:		
East of the County Line, North of Highway No. 175 to Highway No. 178 to Highway No. 50, then to Highway No. 2 to West Street, east to Bay Ridge to the Bay	$ 21.20	4.50

SHEE0100-004 07/01/2005

	Rates	Fringes
Sheet Metal Worker	$ 24.82	11.07

SUMD2002-001 01/08/2002

	Rates	Fringes
Bricklayer	$ 19.71	
Carpenter (Including Drywall Hanging and Acoustical Ceiling Work)	$ 15.91	3.62
Drywall Finisher	$ 13.02	3.94
Ironworker, Ornamental	$ 27.25	2.95
Laborers:		
Pipelayers	$ 11.36	2.08
Unskilled	$ 10.69	2.00
Power equipment operators:		
Backhoes	$ 15.08	2.62
Bulldozers	$ 16.12	
Loaders	$ 13.97	
Rollers	$ 12.85	
Scrapers	$ 13.71	1.00
Tile Finisher	$ 18.10	

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

BID BOND *(See instructions on reverse)*	DATE BOND EXECUTED *(Must not be later than bid opening date)*	OMB NO.:9000-0045

Public reporting burden for this collection of information is estimated to average 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (MVR), Federal Acquisition Policy Division, GSA, Washington, DC 20405.

PRINCIPAL *(Legal name and business address)*

TYPE OF ORGANIZATION *("X" one)*

☐ INDIVIDUAL ☐ PARTNERSHIP

☐ JOINT VENTURE ☐ CORPORATION

STATE OF INCORPORATION

SURETY(IES) *(Name and business address)*

PENAL SUM OF BOND					BID IDENTIFICATION	
PERCENT OF BID PRICE	AMOUNT NOT TO EXCEED				BID DATE	INVITATION NO.
	MILLION(S)	THOUSAND(S)	HUNDRED(S)	CENTS	FOR *(Construction, Supplies, or Services)*	

OBLIGATION:

We, the Principal and Surety(ies) are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit of liability is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The Principal has submitted the bid identified above.

THEREFORE:

The above obligation is void if the Principal - (a) upon acceptance by the Government of the bid identified above, within the period specified therein for acceptance (sixty (60) days if no period is specified), executes the further contractual documents and gives the bond(s) required by the terms of the bid as accepted within the time specified (ten (10) days if no period is specified) after receipt of the forms by the principal; or (b) in the event of failure to execute such further contractual documents and give such bonds, pays the Government for any cost of procuring the work which exceeds the amount of the bid.

Each Surety executing this instrument agrees that its obligation is not impaired by any extension(s) of the time for acceptance of the bid that the Principal may grant to the Government. Notice to the surety(ies) of extension(s) are waived. However, waiver of the notice applies only to extensions aggregating not more than sixty (60) calendar days in addition to the period originally allowed for acceptance of the bid.

WITNESS:

The Principal and Surety(ies) executed this bid bond and affixed their seals on the above date.

PRINCIPAL

SIGNATURE(S)	1. *(Seal)*	2. *(Seal)*	3. *(Seal)*	*Corporate Seal*
NAME(S) & TITLE(S) *(Typed)*	1.	2.	3.	

INDIVIDUAL SURETY(IES)

SIGNATURE(S)	1. *(Seal)*	2. *(Seal)*
NAME(S) *(Typed)*	1.	2.

CORPORATE SURETY(IES)

SURETY A	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	*Corporate Seal*
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) *(Typed)*	1.	2.		

AUTHORIZED FOR LOCAL REPRODUCTION
Previous edition is usable

STANDARD FORM 24 (REV. 10-98)
Prescribed by GSA - FAR (48 CFR) 53.228(a)

SURETY B	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) (Typed)	1.	2.		
SURETY C	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) (Typed)	1.	2.		
SURETY D	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) (Typed)	1.	2.		
SURETY E	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) (Typed)	1.	2.		
SURETY F	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) (Typed)	1.	2.		
SURETY G	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT ($)	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAME(S) & TITLE(S) (Typed)	1.	2.		

INSTRUCTIONS

1. This form is authorized for use when a bid guaranty is required. Any deviation from this form will require the written approval of the Administrator of General Services.

2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.

3. The bond may express penal sum as a percentage of the bid price. In these cases, the bond may state a maximum dollar limitation (e.g., 20% of the bid price but the amount not to exceed _____ dollars).

4. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. where more than one corporate surety is involved, their names and addresses shall appear in the spaces (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)." In the space designed "SURETY(IES)" on the face of the form, insert only the letter identification of the sureties.

(b) Where individual sureties are involved, a completed Affidavit of Individual surety (Standard Form 28), for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning its financial capability.

5. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Corporate Seal"; and shall affix an adhesive seal if executed in Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.

6. Type the name and title of each person signing this bond in the space provided.

7. In its application to negotiated contracts, the terms "bid" and "bidder" shall include "proposal" and "offeror."

PAYMENT INFORMATION FORM
ACH VENDOR PAYMENT SYSTEM

This form is used for ACH payments with an addendum record that carries payment-related information. Recipients of these payments should bring this information to the attention of their financial institution when presenting this form for completion. The information will be transmitted in the CCD+ format to the designated financial institution.

Debt Collection Improvement Act of 1996

PAPERWORK REDUCTION ACT STATEMENT

The information being collected on this form is pursuant to Public Law 104-134, which mandated Electronic Funds Transfer for recipients of all federal payments (excluding IRS tax refunds) beginning July 24, 1996. This information will be needed by the Treasury Department to transmit payments and related data.

COMPANY INFORMATION	
NAME:	
ADDRESS:	
CONTRACT NUMBER: AOC-_____	TAXPAYER IDENTIFICATION NUMBER (TIN):
CONTACT PERSON NAME:	TELEPHONE NUMBER: ( ) FAX NUMBER: ( )

AGENCY INFORMATION	
NAME: ARCHITECT OF THE CAPITOL - FORD HOUSE OFFICE BUILDING	
ADDRESS: ACCOUNTING DIVISION, ROOM H2-205	
WASHINGTON, D.C. 20024	FAX NUMBER: (202) 225-7321
CONTACT PERSON NAME: MR. JAMES JARBOE	TELEPHONE NUMBER: (202) 226-2552

FINANCIAL INSTITUTION INFORMATION	
BANK NAME:	
BRANCH LOCATION: (If applicable)	
CONTACT NAME:	TELEPHONE NUMBER: ( )
NINE DIGIT ROUTING TRANSIT NUMBER: __ __ __ __ __ __ __ __ __	
DEPOSITOR ACCOUNT NUMBER:	
TYPE OF ACCOUNT: ____ CHECKING ____ SAVINGS ____LOCKBOX	
SIGNATURE AND TITLE OF REPRESENTATIVE:	TELEPHONE NUMBER:

Architect of the Capitol
Revised 06/11/99

**** NOTICE ****

TO: ALL VENDORS/CONTRACTORS/CONSULTANTS

FROM: THE OFFICE OF THE ARCHITECT OF THE CAPITOL

Due to requirements set forth in the DEBT COLLECTION IMPROVEMENT ACT OF 1996 (PUBLIC LAW 104-134), all payments made to vendors, contractors and consultants doing business with the Federal Government must be made by Electronic Funds Transfer (EFT) directly to your financial institution. If you are currently enrolled under EFT with the Architect of the Capitol, no further action is necessary other than to report changes.

EFT payments are cost effective, enabling prompt, convenient and reliable payments directly to a designated bank account.

The Architect of the Capitol, in making EFT payments, supplies the financial institution with identifying information (ie. invoice number), which accompanies each transaction. The financial institution in turn can supply this information to the account holder.

Therefore, to accomplish the mandate of P. L. 104-134, it is necessary that the attached sheet; PAYMENT INFORMATION FORM ACH VENDOR PAYMENT SYSTEM be completed and returned with your bid or offer as set forth in Section G of the solicitation.

UNITED STATES CAPITOL POLICE
WASHINGTON, D.C. 20510-7218

CP-491
(4-04)

REQUEST FOR CHECK OF CRIMINAL HISTORY RECORDS

Please report with: (1) A valid form of photo identification, (2) and this form to the Fairchild Building located at 499 South Capitol Street SW Washington, D.C., Room 127 between the hours of 7am until 3pm Monday through Friday for processing.

1. *Name:* (Last, First, Middle)

Address:
Street & No. _____
City & State: _____
Zip: _____ Tele: _____

2. *Other Names Ever Used:* (e.g. maiden name, nickname, ect. *If you have never used another name write "None".)*

3. *Date of Birth:* (Month, Day, Year)

4. *Birthplace:* (City and State or Country)

5. *Social Security Number:*

6. *Gender:*
Male Female

7. *Race:*

8. *Height:*

9. *Weight:*

10. *Eye Color:*

11. *Hair Color:*

SIGNATURE AND RELEASE OF INFORMATION:

READ THE FOLLOWING CAREFULLY BEFORE YOU SIGN:

- I understand that the information provided above will be used to check the criminal history records of the Federal Bureau of Investigation (FBI).
- I consent to the use of the information provided in making a security determination concerning me.
- I certify that, to the best of my knowledge and belief, all of the information provided above is true, correct, and complete, made in good faith.

12. **Signature:** _____

13. **Date:** _____

RELEVANT EXPERIENCE
ATTACHMENT
8
SOLICITATION 060094

CONTRACT TITLE:	
CONTRACT #:	
LOCATION OF WORK:	
ROLE ON CONTRACT: ___PRIME CONTRACTOR ___SUBCONTRACTOR:	
CUSTOMER:	**PHONE #:**
CONTRACTING OFFICER:	**PHONE #:**
DATE OF AWARD:	
DATE OF COMPLETION:	
DOLLAR VALUE OF CONTRACT: ANNUAL VALUE: $	
: TOTAL VALUE: $	
CONTRACT TERM: (1 year with 4 options, etc.)	
CONTRACT TYPE: (Firm Fixed Price, IDQ, etc.)	
: ___SEALED BID ___REQUEST FOR PROPOSAL	

1. Contract Description:

2. Key personnel involved with this contract:

3. Additional Comments:

UNITED STATES CAPITOL POLICE
WASHINGTON, D.C 20510

OFF-SITE DELIVERY CENTER INSTRUCTION

All delivery vehicles will be required to report to the Off-Site Delivery Center for the U.S. Capitol Police located at 4700 Shepherd Parkway S.W., for inspection before proceeding to the Capitol Building via the North Barricade on Constitution Avenue, N.E., the loading dock of the Senate Office Buildings located on D Street, N.E., the loading dock for the Ford House Office Building on Virginia Avenue, S.W., or the Delaware Avenue, S.W., access point for the Rayburn, Longworth, and Cannon Office Buildings' loading docks.

No deliveries will be accepted unless the vehicles have been processed at the Off-Site Delivery Center. The hours of the Off-Site Delivery Center are 5:00a..m. to 2:00p.m., Monday through Friday.

In order to gain access to the loading dock for the Capitol and the House and Senate Office Buildings, you are required to have a letter on file with the United States Capitol Police. The letter must be on **company letterhead** accompanied by signature of the owner, president or manager. Please **print or type** the names in alphabetical order of persons requesting access. Requests for access must be renewed once per year and should contain the following information:

1. Name of the Company
2. Name of the Drivers/Employees Requiring Access
3. Social Security Number for each Driver/Employee
4. Date of Birth for Each Driver/Employee
5. Building(s) to be Accessed
6. Company Contact Person and Phone Number

The above information is to be provided to:

United States Capitol Police
Off-Site Delivery Center
4700 Shepherd Parkway S.W
Washington, D.C. 20032
Fax: 202 226-0571

Any questions can be directed to Off-Site Delivery Center during business hours at 202 226-0905.

AOC PAST PERFORMANCE QUESTIONNAIRE
RFP: 060094

IDIQ CONTRACT FOR VARIOUS REPAIR RENOVATION, AND ALTERATION SERVICES FOR THE ARCHITECT OF THE CAPITOL

The company listed below is preparing an offer on the above project for the Architect of the Capitol, Washington, DC. Your name has been provided as a customer reference regarding performance under a past contract with your agency/company. Your comments are considered Source Selection Sensitive, therefore, you are advised that your response will be safeguarded to the extent cited in the Federal Acquisition Regulation (FAR) 42.1503. FAR prohibits the release of past performance evaluations to other than other Government personnel and the company whose performance is being evaluated during the period the information may be used to provide source selection information.

This past performance questionnaire is being submitted by the contractor and you are requested complete it and return it to the Architect of the Capitol in care of John Friedhoff at FAX number (202)225-3221, or e-mail JFRIEDHO@AOC.GOV on or before the proposal submission due date of August 30, 2006. While all elements below may not apply, please complete as much as possible.

Company/Individual Requesting Past Project Information:

Name:_____

Past Project Title On Which The Company Is Being Evaluated

Project Title :_____

Evaluator POC (for verification purposes)

Name: Agency/Company, POC _____Date:_____

Phone No.:_____ Fax No. _____

E-mail Address: _____

Address:_____

Position held or function in relation to project: _____

AOC PAST PERFORMANCE QUESTIONNAIRE
RFP: 060094

-

Ratings: Please evaluate the contractor's performance using the following ratings:

"O" Outstanding The contractor's performance clearly exceeded the contract requirements.
"S" Satisfactory The contractor's performance met the contract requirements.
"M" Marginal The contractor's performance met the minimum contract requirements but with difficulty.
"U" Unsatisfactory The contractor's performance was poor and/or did not satisfy contract requirements.

Please rate and provide supporting information for the following. If the rating is Outstanding or Unsatisfactory, please provide specific contract/job performance areas which were exceeded or not performed in accordance with the contract's minimum requirements. (Use additional sheets as needed)

1. Performance in meeting delivery/completion schedules: _____

_____ **Rating:** ____

2. What did the contractor do to improve or resolve schedule problems, if any?_____

_____ **Rating:** ____

3. The contractor's quality control (CQC)._____

_____ **Rating:** ____

4. The contractor's performance in delivering quality work in accordance with the contract:

_____

_____ **Rating:** ____

5. The contractor's ability to provide the required work at a reasonable total price._____

AOC PAST PERFORMANCE QUESTIONNAIRE
RFP: 060094

_____ **Rating:** ____

6. The contractor's compliance with labor standards, if applicable._____

_____ **Rating:** ____

7. The contractor's compliance with safety standards. _____

_____ **Rating:** ____

8. Has the contractor been given any of the following: Cure notice, show cause, letters of reprimand, suspension of payments, termination? If yes, please explain. _____

_____ **Rating:** ____

9. Would you award another contract to this contractor? If no, please state reasons for not recommending this contractor additional work. _____

_____ **Rating:** ____

10. Was the customer satisfied with the end product? _____

_____ **Rating:** ____

11. The relationship between the contractor and owner's contract team/Contracting Officer/COR/COTR?

_____ **Rating:** ____

12. The contractor's on-site management and coordination of subcontractors.

_____

_____ **Rating:** ____

AOC PAST PERFORMANCE QUESTIONNAIRE
RFP: 060094

13. The contractor's overall corporate management, integrity, reasonableness and cooperative conduct.

_____

_____ **Rating:** _____

14. Has the contractor filed any modifications?_____ How many? _____

And to what extent? _____

15. Has the contractor been provided an opportunity to discuss any negative performance ratings?

If so, what were the results? _____

16. **OVERALL RATING** **Rating:** _____

17. Please provide any additional comments:_____

_____

_____

_____

_____

_____

_____