

**IFB #158129**

**PROJECT MANUAL**

**Office Building  
Area Headquarters  
New London**

Commonwealth of Virginia  
Department of Transportation

February 1, 2023

Commission No. 15037.012

Project Codes: 501-18041-021

Hughes Associates Architects & Engineers  
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# VIRGINIA DEPARTMENT OF TRANSPORTATION

Salem District  
Office Building AHQ New London  
Project Code: 501-18041-021  
IFB # 158129

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**DGS-30-256**

(Rev. 07/21)

**NOTICE OF  
INVITATION FOR BIDS (IFB)  
IFB No.: 158129  
Project Code No.: 501-18041-021  
New London AHQ Office Building**

Sealed bids are invited for the New London AHQ Office Building located at 5507 Thomas Jefferson Road, Forest, VA 24551. The project is generally described as construction of approximately 1,620 SF office building constructed of metal studs with masonry and fiber cement board facing. Roof consists of prefabricated wood trusses with shingles. Site work includes a septic system, a new domestic water service line, underground electrical service, emergency generator, paving and ADA parking spaces. Veedor-Root control box relocated to the new building.

Sealed bids will be received electronically through eVA. To submit an online bid, please refer to the online bidding instructions at: <https://www.youtube.com/watch?v=KSxcAkOekW0>. If Bidder encounters any problem in entering responses into eVA, they must contact [eVA Customer Care](#) to place a ticket. eVA Customer Care Hours are from 8:15am to 5:00pm.

**The deadline for submitting bids is 2:00 P.M. sharp, as determined by the Bid Officer, on February 13, 2023.**

A public bid opening via teleconference will be hosted by a VDOT representative. The bids will be opened publicly and read aloud **beginning 2:00 PM on February 14, 2023**. The conference can be accessed with the below dial-in information:

Microsoft Teams meeting:

**Join on your computer, mobile app, or room device.**

[Click here to join the meeting](#)

Meeting ID: 284 668 379 786

Passcode: nVePBC

[Download Teams](#) | [Join on the web](#)

**Or call in (audio only)**

+1 434-230-0065,,209286717# United States, Lynchburg

Phone Conference ID: 209 286 717#

[Find a local number](#) | [Reset PIN](#)

[Learn More](#) | [Meeting options](#)

**A five percent (5%) bid bond is required to accompany this bid.** When required bid shall be accompanied by a **Commonwealth of Virginia Standard Bid Bond, Form CO-10.2**, payable to the Owner as obligee in an amount equal to five percent (5%) of the amount of the bid. **Failure to submit the bid bond on the Commonwealth of Virginia Standard Bid Bond, Form CO-10.2 will result in the bid being considered non-responsive.** (When bid bonds are requested, the awarded contractor will be required to furnish Performance and Payment Bond.)

**eVA Vendor Registration:** The bidder or offeror shall be a registered vendor in eVA. See the attached **eVA Vendor Registration Requirements**.

**DGS-30-256**

(Rev. 07/21)

Procedures for submitting a bid, claiming an error, withdrawal of bids and other pertinent information are contained in the Instructions to Bidders, which is part of the Invitation for Bids. Withdrawal due to error in bid shall be permitted in accord with Section 9 of the Instructions to Bidders and § 2.2-4330, Code of Virginia. The Owner reserves the right to reject any or all bids.

An OPTIONAL pre-bid conference will be held at the VDOT New London AHQ located at **5507 Thomas Jefferson Road, Forest, VA 24551** at **10:00am**, on January 24<sup>th</sup>, 2024. **Mr. Mikel “Mike” O’Malley, Salem District Facilities Manager of VDOT and Mr. John Garrett (Project Manager/Architect) of Hughes Associates Architects & Engineers** will be conducting the showing. Attendance shall be optional for those submitting a bid. This is not a mandatory project showing, however, potential bidders are encouraged to visit the site of the proposed work. The submission of a bid will be considered as conclusive evidence that the bidder has made such examination and/or is satisfied as to the conditions to be encountered in performing the work.

**The contract shall be awarded on a lump sum basis as follows: the Total Base Bid Amount including any properly submitted and received bid modifications plus such successive Additive Bid Items as the Owner in its discretion decides to award in the manner set forth in Paragraph 12 of the Instructions to Bidders. ‘Notice of Award’ or ‘Notice of Intent to Award’ will be posted on eVA, Virginia Department of General Services’ central electronic procurement website, at <https://eva.virginia.gov>**

Contractor registration is required in accordance with Section 54.1-1103 of the Code of Virginia. See the Invitation for Bids for additional qualification requirements.

All executive branch agencies are directed to advance Executive Order 35, dated July 3, 2019.

The Invitation for Bids for the above project, including the drawings and the specifications containing the information necessary for bidding, may be obtained from Joshua Saunders, at [Joshua.saunders@vdot.virginia.gov](mailto:Joshua.saunders@vdot.virginia.gov).

Copies of the Invitation for Bids documents, including the plans and the specifications, will also be available for inspection at the following locations:

<https://eva.virginia.gov>

Joshua Saunders, VCO, VCCO  
Authorized Official of Owner/Agency

Attachment: eVA Vendor Registration Requirements



**DGS-30-384**  
(Rev. 01/21)

### **Vendor eVA Registration Requirements**

***eVA Business-to-Government Vendor Registration, Contracts, and Order:** The eVA Internet electronic procurement solution, web site portal [www.eVA.virginia.gov](http://www.eVA.virginia.gov), streamlines and automates government purchasing activities in the Commonwealth. The eVA portal is the gateway for vendors to conduct business with state agencies and public bodies. All vendors desiring to provide construction and/or professional services to the Commonwealth shall participate in the eVA Internet e-procurement solution by completing the free eVA Vendor Registration. All bidders or offerors must register in eVA and pay the Vendor Transaction Fees specified below; failure to register will result in their bid/proposal being rejected.*

*Vendor transaction fees are determined by the date the original purchase order is issued and the current fees can be found on the eVA website at <https://eva.virginia.gov/eva-billing.html>.*

***eVA Orders and Contracts:** The solicitation/contract will result in **(One (1))** purchase order(s) with the eVA applicable transaction fee assessed for each order.*

## INSTRUCTIONS TO BIDDERS

**The Invitation For Bids (“IFB”)** consists of the Notice, these Instructions To Bidders, the Bid Form, the Pre-Bid Question Form, the General Conditions of the Construction Contract, the Supplemental General Conditions (if any), the Special Conditions (if any), the Forms to be used, and the Scope of Work as described by the Plans and Specifications, other documents listed in the Specifications, and any addenda which may be issued, all of which request qualified bidders to submit competitive prices or bids for providing the described work of the Contract.

As used herein, the terms “bidder” and “Contractor” both shall refer to the Person submitting a bid.

**eVA Vendor Registration:** The bidder shall be a registered vendor in eVA. See the attached **eVA Vendor Registration Requirements**.

1. **CONDITIONS AT SITE OR STRUCTURE:** Bidders shall visit the Site and shall be responsible for ascertaining pertinent local conditions such as location, accessibility, general character of the Site, structure or building, and the character and extent of existing conditions, improvements or work within or adjacent to the Site. No Claims shall be submitted as a result of Bidder’s failure to have done so, but shall be deemed waived and will not be considered by the Owner. See Section 7 of the General Conditions entitled "Conditions at Site."
  
2. **EXPLANATIONS TO BIDDERS:** No oral explanation in regard to the meaning of drawings and specifications will be made and no oral instructions will be given before the award of the Contract. The Owner shall not be responsible for any conclusions, assumptions or interpretations made by bidders during the preparation of bids that are contrary to the Drawings and Specifications and their clear intent. Discrepancies, conflicts, errors, omissions or doubts as to the meaning of the Contract Documents shall be communicated in writing to the A/E for interpretation. Bidders **must** use the "Prebid Question Form" provided in the bid documents. Bidders must so act to assure that questions reach the A/E at least six (6) days prior to the time set for the receipt of bids to allow a sufficient time for an addendum to reach **all bidders** before the submission of their bids. If, however, there are two (2) weeks or less between the first bid advertisement and the time set for receipt of bids, then bidders must submit questions so that they reach the A/E no later than three (3) days prior to the time set for receipt of bids. Any interpretation made will be in the form of an addendum to the Specifications which will be forwarded to all bidders, and its receipt shall be acknowledged by the bidder on Bid Forms. If such discrepancies, conflicts, errors, omissions or doubts are reasonably apparent or should have been reasonably apparent to the bidder, and the bidder failed to submit questions to the A/E in the time and manner required herein and the Contract is awarded to the bidder, then any claims shall be deemed waived and the bidder shall not be entitled to additional compensation or time, or entitled to sue the Owner based on such discrepancies, conflicts, errors, omissions, or doubts.
  
3. **TIME FOR COMPLETION:**
  - (a) "Time for Completion" shall be designated by the Owner on the Invitation for Bids or other prebid documents and shall mean the number of consecutive calendar days following the issuance of the Notice to Proceed which the Contractor has to substantially complete all Work required by the Contract. In some instances, the Time for Completion may be stated in the form of a Contract Completion Date based on a stipulated date of Notice to Proceed.  
  
Unless otherwise specified, the Contractor shall achieve Final Completion within thirty (30) days after the date of Substantial Completion.
  - (b) When the Notice to Proceed is issued, it will state a Contract Completion Date, which has been set by the Owner based on date of the Notice to Proceed and the Time for Completion.

- (c) The Contractor, in preparing and submitting its bid, is required to take into consideration normal weather conditions. Normal weather does not mean statistically average weather, but rather means a range of weather patterns which might be anticipated based on weather conditions and events for the past ten (10) years. Normal weather conditions shall be determined from the public historical records available, including the U.S. Department of Commerce, Local Climatological Data Sheets, Oceanic and Atmospheric Administration/Environmental Data and Information Service, National Climatic Center and the National Weather Service. The data sheets to be used shall be for the locality or localities closest to the Site. No additional compensation, costs or damages will be paid to the Contractor because of normal weather conditions, including normal adverse weather to be anticipated during the Project. An extension of time for abnormal adverse weather conditions which directly impact the Work will be considered by the Owner as set forth in the General Conditions.
- (d) If the Owner designates the public historical climatological records to be used to establish normal weather patterns, the bidder shall use those records in estimating and preparing its bid. If the Owner requests each bidder to indicate the weather pattern records used in preparation of a bid, each bidder may select the public historical climatological records upon which it will rely in preparing its bid. In the latter situation, each bidder shall designate in the space provided which of such climatological data records were used in preparing the bid. A bidder's failure to designate climatological records when submitting a bid shall not disqualify a bid, but shall constitute a waiver of any claim or request for an extension of time as the result of abnormal adverse weather. In either case, the bid submitted and the Time for Completion shall be presumed to have been based upon normal weather patterns, including normal adverse weather, as derived from the climatological records used.

#### 4. PREPARATION AND SUBMISSION OF BIDS:

- (a) Bids shall be submitted on the forms furnished, or copies thereof, and shall be signed in ink, or in the case of bids submitted electronically, signatures shall be in accordance with Code of Virginia § 59.1-479 *et seq.* The Owner's agreement to accept electronic bids, if made, will be indicated in the IFB. Erasures or other changes in a bid must be explained or noted over the signature of the bidder. Bids containing any conditions, omissions, unexplained erasures, alterations or items not called for in the proposal, or irregularities of any kind, may be rejected by the Owner as being incomplete or nonresponsive.
- (b) Each bid must give the complete legal name and full business address of the bidder and be signed by the bidder, or the bidder's authorized representative. Bids by partnerships must be signed in the partnership name by one of the general partners of the partnership or an authorized representative, followed by the designation/title of the person signing, and a list of the partners. Bids by joint ventures must be signed in the joint venture name by one of the joint venturers or an authorized representative of one of the joint venturers, followed by the designation/title of the person signing, and a list of the joint venturers. Bids by corporations must be signed with the legal name of the corporation followed by the name of the state in which it is incorporated and by the signature and title of the person authorized to bind it in this matter. The name of each person signing shall be typed or printed below the signature. A signature on a bid by a person who identifies their title as "President," "Secretary," "Agent" or other designation without disclosing the principal firm, shall be held to be the bid of the individual signing. When requested by the Owner, satisfactory evidence of the authority of the officer signing on behalf of the corporation shall be furnished. Trade or fictitious names may be referenced by using "t/a \_ \_ \_," but bids shall be in the legal name of the person or entity submitting the bid.
- (c) Bids with the bid guarantee shall be enclosed in a sealed envelope which shall be marked and addressed as indicated by the advertisement. If a Contract is for one hundred twenty thousand

dollars (\$120,000) or more, or if the total value of all construction, removal, repair or improvements undertaken by the bidder within any twelve-month period is seven hundred fifty thousand dollars (\$750,000) or more, the bidder is required under Code of Virginia §§ 54.1-1100, *et seq.*, to be licensed in Virginia as a "Class A Contractor." If a Contract is for ten thousand dollars (\$10,000) or more, but less than one hundred twenty thousand dollars (\$120,000), or if the total value of all construction, removal, repair or improvements undertaken by the bidder within any twelve-month period is one hundred fifty thousand dollars (\$150,000) or more, but less than seven hundred fifty thousand dollars (\$750,000), the bidder is required to be licensed in Virginia as a "Class B Contractor." The bidder shall place on the outside of the envelope containing the bid and shall place in the bid over its signature whichever of the following notations is appropriate and insert its Contractor license/registration number:

Licensed Class A Virginia Contractor No. \_\_\_\_\_  
or  
Licensed Class B Virginia Contractor No. \_\_\_\_\_

If the bidder is not properly licensed in Virginia at the time the bid is submitted, or if the bidder fails to provide this information on its bid or on the envelope containing the bid and fails to promptly provide said Contractor license number to the Owner in writing when requested to do so before the opening of bids, the bidder shall be deemed to be in violation of Code of Virginia § 54.1-1115 and its bid will not be considered.

- (d) Following guidance from the Board for Contractors, the Owner may, as a part of determining whether the bidder is "responsible," require the apparent low bidder to submit a listing of its Subcontractors along with the license number and classification or specialty of each. *See DEP'T OF PROF'L AND OCCUPATIONAL REGULATION, BD. FOR CONTRACTORS POLICIES & INTERPRETATIONS, No. 2959 (July 11, 2016)* ("A licensed contractor may bid on work, or enter into a contract for work, which is outside the scope of [its] license classification(s) provided that [it] subcontracts that work, to properly licensed contractors, and the work of the subcontractors is incidental to the contract.").
- (e) The bidder must place its Employer Identification Number (SSN or FEIN) in the space provided on the Bid Form.
- (f) Every bidder organized as a stock or nonstock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership must be authorized to transact business in the Commonwealth as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the Code of Virginia, as amended, or as otherwise required by law. Any bidder organized or authorized to transact business in the Commonwealth pursuant to Title 13.1 or Title 50 must include in its bid the identification number issued to it by the State Corporation Commission. Any bidder that is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 or as otherwise required by law shall include in its bid or proposal a statement describing why the bidder is not required to be so authorized. A bidder required to be authorized to transact business in Virginia that fails to provide the required information shall not receive an award unless a waiver of this requirement and of any administrative policies and procedures established to implement Code of Virginia § 2.2-4311.2 is granted by the chief executive of the Owner.

If awarded the Contract, the bidder shall not allow its existence to lapse or its certificate of authority or registration to transact business in the Commonwealth, if so required under Title 13.1 or Title 50, to be revoked or cancelled at any time during the term of the Contract. Doing so shall be deemed to be a violation of Code of Virginia § 2.2-4311.2 and the bidder understands and agrees that the Owner may void the Contract if the bidder fails to comply with this provision.

- (g). *Code of Virginia, § 2.2-4376.2* shall be applicable to the Work of the Contract.

**5. BID GUARANTEE:**

- (a) Any bid (including the Total Base Bid plus all Additive Bid Items) which exceeds five hundred thousand dollars (\$500,000) shall be accompanied by a Commonwealth of Virginia Standard Bid Bond, Form CO-10.2, payable to the Owner as obligee in an amount equal to five percent (5%) of the amount of the bid (the "Bid Bond"). The Owner agrees to accept a Bid Bond on which the Surety has utilized electronic signatures and/or electronic notarization if the electronic notarization meets the requirements of *Virginia Code §§ 47.1-6.1, -7, and -12*, and the Commonwealth of Virginia State Corporation Commission Bureau of Insurance and the Bid Bond contains any SURETY BOND SEAL ADDENDUM established by the Commonwealth of Virginia State Corporation Commission Bureau of Insurance. For construction contracts up to \$500,000, where bid bond requirements have been waived by Owner as stated in the IFB, prospective Contractors may be prequalified in accordance with *Code of Virginia § 2.2-4317.A*. A Bid Bond may be required for Contracts having bids of up to five hundred thousand dollars (\$500,000) if such requirement is stated in the IFB. The Bid Bond must be issued by a surety company which is legally authorized by the Virginia State Corporation Commission to do surety business in the Commonwealth of Virginia. Such Bid Bond shall guarantee the following: that the bidder will not withdraw its bid during the thirty (30) day period following the date of the opening of bids; that if the bid is accepted, the bidder will enter into the Contract with the Owner described in the IFB; that the bidder can and will submit a properly executed and authorized Standard Performance Bond and Standard Labor and Material Payment Bond on the forms included in the IFB. If the bidder withdraws its bid within the thirty (day) period following bid opening, fails to enter into the Contract, or fails to provide the required Standard Performance Bond and Standard Labor and Material Payment Bond within ten (10) days after the bidder's receipt of notice of acceptance of its bid, the bidder and the bidder's surety shall be jointly and severally be liable to the Owner for the difference between the amount specified in the bidder's bid and such larger amount for which the Owner may contract with another party to perform the work covered by said bid, up to the amount of the bid guarantee of 5% of the bidder's total bid amount, as the damage to the Owner resulting from the bidder's default. See *Code of Virginia §2.2-4336*.
- (b) *Code of Virginia § 2.2-4338* contains provisions allowing for alternative forms of bid security in lieu of a Bid Bond. A bidder's use of an alternative form of Security as listed in *Code of Virginia § 2.2-4338.B* must be approved by the Owner prior to the bidder's submission of its bid on the Bid Receipt date and time to be accepted in lieu of a Bid Bond.
- (c) The Bid Bond or other alternative bid security will be returned to all but the three lowest bidders after the formal opening of bids. The remaining Bid Bonds or bid security will be returned to the bidders after the Owner and the accepted bidder have executed the Contract and the required Standard Performance Bond and the Standard Labor and Material Payment Bond for the Contract have been received and approved by the Owner.
- (d) If the Contract and required bonds have not been executed by the accepted bidder within thirty (30) days after the date of the opening of the bids, then the Bid Bond or other bid security of any bidder will be returned upon a bidder's request, provided the bidder has not been notified of the acceptance of its bid prior to the date of such request.

- 6. WITHDRAWAL OR MODIFICATION OF BIDS:** Bids may be withdrawn or modified by written or telefaxed notice received at the designated location from bidders prior to the deadline fixed for bid receipt. E-mail withdrawals and modifications are not acceptable. The withdrawal or modification may be made by the person who signed the bid or by an individual(s) who is authorized by the bidder on the face of the bid. Written modifications may be made on the bid form itself, on the envelope in which the bid is enclosed, or on a separate document. Written modifications, whether the original is delivered or telefaxed, must be

signed by the person making the modification or withdrawal. The modification must state specifically what is to be modified and by what amount or it must state the item to be modified and what the corrected amount should be.

**7. RECEIPT OF BIDS:**

- (a) **Bids will be received at or before the date and the hour and at the place stipulated in the IFB as may be modified by subsequent Addenda.**
- (b) **It is the responsibility of the bidder to assure that its bid and any bid modifications are delivered to the place designated for receipt of bids by the date and hour (deadline) set for receipt of bids. Therefore, it is the bidder's responsibility to take into account all factors which may impact on its bid deliverer / courier's ability to deliver the bid and to implement whatever actions are necessary to have the bid delivered to the proper bid receipt location prior to the bid receipt deadline.** No bids or bid modifications submitted or offered after the date and hour designated for receipt of bids will be accepted or considered.
- (c) The Bid Officer is the Owner's representative designated to receive bids at the time and place noted in the IFB and to open the bids received at the appointed time.
- (d) **The official time used for the receipt of responses is determined by reference to the clock designated by the Bid Officer.** The Bid Officer shall determine when the Bid Receipt Deadline has arrived and shall announce that the Deadline has arrived and that no further bids or bid modifications will be accepted. All bids and bid modifications in the possession of the Bid Officer and their assistants at the time the announcement is completed are deemed to be timely, whether or not the bid envelope has been physically date/time stamped or otherwise marked by the time the Bid Officer makes the deadline announcement.
- (e) In the event the bid receipt occurs during a period of suspended state business operations, the receipt and opening will be delayed one business day.

**8. OPENING OF BIDS:**

- (a) Bids will be opened at the time and place stated in the IFB or as modified by subsequent Addenda, and their contents publicly announced. The Bid Officer shall decide when the specified time for bid opening has arrived. No responsibility will be attached to any officer or agent for the premature opening of a bid not properly addressed and identified. Bid opening shall be no sooner than twenty-four (24) hours after the time set for receipt of bids.
- (b) The provisions of Code of Virginia § 2.2-4342, as amended, shall be applicable to the inspections of bids received.
- (c) In the event the bid opening occurs during a period of suspended state business operations, the opening will be delayed until the next business day.

**9. ERRORS IN BIDS:** A bidder may withdraw its bid from consideration if the price bid was substantially lower than the other bids due solely to a mistake therein, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn.

In accordance with Code of Virginia § 2.2-4330(B)(2), the bidder must submit to the Owner its original work papers, documents and materials used in the preparation of the bid within one day after the date fixed for submission of bids. Such work papers must be submitted in an envelope or package separate and apart

from the envelope containing the bid and marked clearly as to the contents and shall be delivered to the Owner by the bidder in person or by registered mail prior to the time fixed for the opening of bids and may not be withdrawn until after the two-hour period (referred to later) has elapsed. The bids shall be opened at the time designated in the IFB, as amended by addendum. Bid opening is usually one day following the time fixed by the Owner for the submission of bids, but no sooner. Once the bids have been opened, the bidder shall have two (2) hours after the opening of bids within which to claim in writing any mistake as defined herein and withdraw its bid. The Contract shall not be awarded by the Owner until such two-hour period has elapsed. Such mistake shall be proved only from the original work papers, documents and materials delivered to the Owner prior to bid opening. This procedure in Code of Virginia § 2.2-4330(B)(2) shall not apply to when the entire bid is required to be submitted on a unit price basis.

Failure of a bidder to submit its original work papers, documents and materials used in the preparation of its bid on or before the time, date and place required shall constitute a waiver by that bidder of its right to withdraw its bid due to a mistake.

No bid may be withdrawn under this section when the result would be the awarding of the Contract on another bid of the same bidder or of another bidder in which the ownership of the withdrawing bidder is more than five (5%) percent.

No bidder who is permitted to withdraw a bid shall, for compensation, supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the Contract is awarded or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn bid was submitted. The person or firm to whom the Contract was awarded and the withdrawing bidder are jointly liable to the Owner in an amount equal to any compensation paid to or for the benefit of the withdrawing bidder without such approval.

If the apparent low bid is withdrawn under authority of this section, the lowest remaining bid shall be deemed to be the low bid on the project.

- 10. REJECTION OF BIDS:** The Owner reserves the right to cancel the IFB, to reject any and all bids at its sole discretion when such rejection is in the interest of the Owner, or to reject the bid of any bidder who is determined to be not responsive or not responsible. *See* Code of Virginia § 2.2-4319.

**11. DETERMINATION OF RESPONSIBILITY**

Each bidder shall be prepared, if so requested by the Owner, to present evidence of its experience, qualifications and financial ability to carry out the terms of the Contract.

Prior to award of the Contract, an evaluation will be made to determine if the low bidder has the capability, in all respects, to perform fully the contract requirements and the moral and business integrity and reliability which will assure good faith performance, and who has been prequalified, if required. Factors to be evaluated include, but are not limited to:

- (a) sufficient financial ability to perform the contract as evidenced by the bidder's ability to obtain payment and performance bonds from an acceptable surety;
- (b) appropriate experience to perform the Work described in the bid documents;
- (c) any judgments entered against the bidder, or any officers, directors, partners or owners for breach of a contract for construction;
- (d) any substantial noncompliance with the terms and conditions of prior construction contracts with a public body without good cause where the substantial noncompliance is documented; or
- (e) a conviction of the bidder or any officer, director, partner, project manager, procurement manager, chief financial officer, or owner in the last five years of a crime relating to governmental or nongovernmental construction or contracting; and/or

(f) any current debarment of the contractor, any officer, director or owner, from bidding or contracting by any public body of any state, any state agency, or any agency of the federal government.

The Owner reserves the right to disqualify or refuse to accept the bid of any bidder who has been convicted, or entered a plea of guilty or nolo contendere, in any federal or state court to any charge involving any unlawful, corrupt or collusive practice involving a public contract whether federal, state, or local, or who has been determined in any judicial proceeding to have violated any antitrust, bid-rigging or collusive practice statute in connection with any public contract, or against whom such formal criminal prosecution or other judicial proceeding has been initiated.

A bidder who, despite being the apparent low bidder, is determined not to be a responsible bidder shall be notified in writing in conformance with the procedures in Code of Virginia § 2.2-4359.

## 12. AWARD OF CONTRACT

(a) **Basis for Contract Award:** The Contract, if awarded, will be awarded to the lowest responsive and responsible bidder, if any, provided its bid is reasonable and it is in the best interest of the Owner to accept it and subject to the Owner's right to reject any and all bids and to waive informality in the bids and in the bidding. The Bid Form contains a multi-part Base Bid and may contain Additive Bid Items. Determination of the lowest responsible bidder, if any, will be based on the Total Base Bid Amount **entered on the Bid Form** including any properly submitted bid modifications plus as many Additive Bid Items taken in sequence as the Owner in its discretion chooses to Award. **Where the sum of the values entered in the multiple parts do not agree with the Total Base Bid amount, the Total Base Bid amount entered on the bid form, including any properly submitted bid modifications, shall take precedence.**

In the event that the Total Base Bid from the lowest responsible bidder exceeds available funds, the Owner may negotiate the Total Base Bid amount with the apparent low bidder to obtain a Contract Price within available funds, pursuant to Code § 2.2-4318 and Section 12(c) herein.

(b) **Informalities:** The Owner reserves the right to waive any informality in the bids when such waiver is in the interest of the Owner.

(c) **Negotiation With Lowest Responsible Bidder:** If award of the Contract to the lowest responsive and responsible bidder is precluded because of limitations on available funds, under the provisions of Code § 2.2-4318 the Owner reserves the right to negotiate the Total Base Bid amount with the lowest responsive, responsible bidder to obtain a Contract Price within the available funds. This may involve changes in either the features or scope of the work included in the Base Bid. Such negotiations with the apparent low bidder may include reducing the quantity, quality, or other cost saving mechanisms involving items in the Total Base Bid. Negotiations for Additive Bid Items are excluded. The Owner shall notify the lowest responsive and responsible bidder that such a situation exists and the Owner and bidder shall then conduct their negotiations in person, by mail, by telephone or by any means they find convenient. If an acceptable Contract can be negotiated, any changes to the IFB documents agreed upon in the negotiations shall be summarized in a "Post Bid Modification" and included in the Contract. If an acceptable Contract cannot be negotiated, the Owner shall terminate negotiations and reject all bids.

(d) **Notice of Intent to Award or Notice of Award:** The Notice of Award or the Notice of Intent to Award will be posted at the Agency's standard location for posting notices **as shown on the "Notice of Invitation to Bid"**. In addition, the Agency may also post such notice on the Agency's Website and/or the DGS central electronic procurement Website. Any bidder who desires to protest the award or decision to award a contract shall submit the protest in writing to the public body no later than ten days after the posting of the Notice of Award or Notice of Intent to Award, whichever comes first. *See* Code of Virginia § 2.2-4360.



13. **CONTRACT SECURITY:** For contracts which exceed five hundred thousand dollars (\$500,000), the Standard Performance Bond (CO-10) and the Standard Labor and Material Payment Bond (CO-10.1) shall be required, as specified in the IFB. For construction contracts up to \$500,000, where Bid Bond requirements are waived, prospective contractors may be prequalified in accordance with Code of Virginia § 2.2-4317. See General Conditions and Code of Virginia § 2.2-4337 and § 2.2-4338. The Owner reserves the right to require such bonds for contracts up to five hundred thousand dollars (\$500,000). If the Owner so elects, the requirement shall be set forth in the IFB.
14. **CERTIFICATION:** The bidder, by its signature on the Bid Form, certifies that neither its organization nor any of its officers, directors, partners or owners is currently barred from bidding on contracts by any Agency of the Commonwealth of Virginia, or any public body or agency of another state, or any agency of the federal government. See "Disqualification of Contractors" in the Bid Form.
15. **ETHICS IN PUBLIC CONTRACTING:** The provisions, requirements and prohibitions as contained in Code of Virginia §2.2-4367 *et seq.*, pertaining to bidders, offerors, contractors, and subcontractors are applicable to this project.
16. **BUILDING PERMITS:** Because this is a Project of the Commonwealth of Virginia, codes or zoning ordinances of local political subdivisions do not apply. However, the Virginia Uniform Statewide Building Code shall apply to the Work and shall be administered by the Building Official for State-owned Buildings. The Building Permit will be obtained and paid for by the Owner. All other permits, local license fees, business fees, taxes, or similar assessments imposed by the appropriate political subdivision shall be obtained and paid for by the Contractor. See Section 25 of the General Conditions for utility connection fees and services.
17. **UTILIZATION OF SMALL BUSINESSES:** It is the policy of the Commonwealth of Virginia to maximize the participation of small businesses in state contracting. The participation of these businesses directly and through partnerships, joint ventures, subcontracts and other contractual opportunities may be encouraged for this Project based on the Owner's requirements (if applicable) on the Bid Form. Bidders shall provide a Small Business Procurement Plan in conjunction with their sealed bid. The Small Business Procurement Plan shall identify the bidder's proposed percentage of participation by small businesses in the Total Base Bid amount, and is indicated on the Bid Form. An entry on the line for "Contractor's Proposed Small Business Participation" is required for the bid to be considered responsive. If the bidder is a DSBSD certified small business, the proposed percentage of small business participation shall be entered as 100%. A bidder may enter a proposed percentage of small business participation of 0% and be considered responsive unless the Bid Form states that the Owner requires a specific percentage of small business participation, in which case the bidder shall enter a percentage equal to or greater than the Owner's required small business participation percentage for the bid to be considered responsive.
18. **BID DOCUMENTS:** Bid Documents are the property of the Owner and a deposit in an amount as stated in the Invitation for Bids is required for each paper set or for each set provided on removable electronic media as a guarantee of the safe return of the documents within ten (10) days of bid opening. This deposit will be refunded in full on not more than two paper sets or sets provided on removable electronic media to each bidder who submits a Contract bid and who returns the documents in good condition. Refund will be made on paper sets and sets provided on removable electronic media to non-bidders and Subcontractors in the amount of half of the deposit when the sets are returned in good condition within 10 days. A deposit is not required for downloading of electronic construction documents through an FTP site. A non-refundable shipping charge may be required for paper sets or sets provided on removable electronic media if stated in the Notice or the IFB.
19. **GENERAL CONDITIONS:** The General Conditions are incorporated in the bid documents. If a copy of the General Conditions is not included in the bid documents, the bidder may obtain a copy of the current edition of the General Conditions at no cost by written request to the A/E and/or the Agency where the bid

documents are obtained. Copies may also be obtained from the DGS Forms Center (available online at <http://forms.dgs.virginia.gov>).

20. **PREBID CONFERENCE:** See the IFB for requirements for a prebid conference and whether such conference is mandatory or optional.
21. **INSPECTION OF BID DOCUMENTS:** Copies of the IFB documents including Plans and Specifications and the General Conditions will be available for inspection at the Agency, at the A/E's office, and at the locations listed in the Notice of the IFB.
22. **DRUG-FREE WORKPLACE REQUIRED:** Bidders are reminded that Code of Virginia § 2.2-4312 requires that the during the performance of the Contract resulting from this solicitation, the Contractor agrees to: (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every Subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each Subcontractor or vendor.

For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific Contract awarded to a Contractor in accordance with this solicitation, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

**NOTE:** These CO-7A, Instructions to Bidders, have been created specifically for the use of agencies of the Commonwealth of Virginia, which may not alter their provisions without the express written approval of the Virginia Department of General Services, Division of Engineering and Buildings. These Instructions to Bidders have significant legal implications and shall not be altered or modified. Nothing in the CO-7A, Instructions to Bidders, shall be amended or deleted or its intent changed, except by an approved and properly issued 'Supplemental Instruction to Bidders'. The Commonwealth makes no representation as to their suitability for any other purpose. Paragraphs which have been added or revised since prior edition are identified with a line to the left of the paragraph.



**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF LABOR AND INDUSTRY**

**Gary G. Pan**  
COMMISSIONER

Main Street Centre  
600 East Main Street, Suite 207  
Richmond, Virginia 23219  
PHONE (804) 371-2327  
FAX (804) 371-6524

Virginia Department of Labor and Industry Wage Determination Decision

Project Name	New London AHQ Office Building
State Project Code	501-18041-021
DOLI Project Number	VDOT-23-0210 UPDATE
County or Independent City	Bedford County
Publication Date	01/09/2024
Construction Type	Building

Wage Determinations	Wage	Fringe
Asbestos Worker/Heat & Frost Insulator (Duct, Pipe & Mechanical System Insulation)*	\$40.02	\$19.67
Boilermaker	\$42.62	\$24.81
Bricklayer	\$22.44	\$10.23
Carpenter	\$14.81	\$2.19
Electrician	\$21.78	\$9.31
Ironworker	\$36.10	\$25.19
Ironworker, Reinforcing	\$25.36	\$6.68
Laborer: Common or General, Including Pipelaying	\$12.40	\$1.68
Laborer: Mason Tender - Brick	\$13.41	\$3.15
Laborer: Mason Tender - Cement/Concrete	\$15.32	
Operator: Backhoe/Excavator/Trackhoe	\$16.24	\$0.87
Operator: Bobcat/Skid Steer/Skid Loader	\$18.95	\$4.03

Wage Determinations	Wage	Fringe
Operator: Bulldozer	\$16.00	
Operator: Forklift	\$19.40	\$7.00
Operator: Loader	\$21.28	\$3.17
Operator: Roller	\$16.25	\$4.88
Painter (Brush and Roller)	\$20.01	
Painter (Spray Only)	\$27.46	\$11.56
Pipefitter	\$24.98	\$9.14
Plumber	\$21.15	\$3.92
Power Equipment Operator: Cranes 90 Tons &Over capacity; Tower &Climbing Cranes with Controls 100 ft. Above Ground	\$34.17	\$15.21
Power Equipment Operator: Cranes Under 90 Tons	\$33.26	\$15.12
Rofer	\$16.17	\$3.73
Sheet Metal Worker, Includes HVAC Duct Installation	\$18.38	\$3.30
Tile Finisher	\$23.40	
Tile Setter	\$27.80	\$10.25
Truck Driver: Dump Truck	\$16.58	\$1.73

## Additional Notes

\* Asbestos Worker/Heat & Frost Insulator (Duct, Pipe & Mechanical System Insulation) \* PAID HOLIDAYS: New Year's Day, Martin Luther King Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the day after Thanksgiving and Christmas Day provided the employee works the regular work day before and after the paid holiday. \*

All wage rates to be used on a contract will be set at the time the contract is awarded. While DOLI maintains a list of wage determinations online for reference purposes, only the wage determinations made in an official Wage Determination Decision, sent by DOLI to the contracting agency, can be used to ascertain the exact rates to be paid for a specific contract.

All rates are determined by DOLI and any appeals of specific classifications may be made through the Wage Determination Appeal form available at <http://www.doli.virginia.gov/wp-content/uploads/2021/04/Appeal-for-Wage-Determination-Clarification.pdf>

Any additional classifications may be requested through the Additional Wage Classification form available at <http://www.doli.virginia.gov/wp-content/uploads/2021/04/Request-for-Additional-Wage-Classification.pdf>

Understand your duties as a contractor under Virginia law by referencing our Contractor Responsibilities information sheet available at <http://www.doli.virginia.gov/wp-content/uploads/2021/04/PREVAILING-WAGE-CONTRACTOR-RESPONSIBILITIES.pdf>

Your employees have specific rights, which can be found on our List of Employee Rights information sheet available at <http://www.doli.virginia.gov/wp-content/uploads/2021/04/PREVAILING-WAGE-EMPLOYEE-RIGHTS.pdf>

Any further questions should be directed to [PrevailingWage@doli.virginia.gov](mailto:PrevailingWage@doli.virginia.gov)

**DGS-30-272**  
(Rev. 04/15)

**PREBID QUESTION FORM**  
(Use separate Form for each question submitted.)

**Date:** \_\_\_\_\_

**Project Title:** New London AHQ Office Building

**Project Code No.:** 501-18041-021

The following question concerns Drawing Sheet (number) \_\_\_\_\_:

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The following question concerns Specifications Section (number) \_\_\_\_\_, page \_\_\_\_\_, paragraph \_\_\_\_\_:

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**All responses to questions will be made by Addendum.**

**Question submitted by:** \_\_\_\_\_

Name

Organization

**Bidders shall submit form to:** Joshua L. Saunders Virginia Department of Transportation

Name

Organization

Email address:

[Joshua.saunders@vdot.virginia.gov](mailto:Joshua.saunders@vdot.virginia.gov)

**BID FORM**

DATE: December 1, 2023  
PROJECT: New London AHQ Office Building  
Project Code: 501-18041-021  
IFB No: 158129

To: Commonwealth of Virginia  
Virginia Department of Transportation (VDOT)

In compliance with and subject to your Invitation for Bids and the documents therein specified, all of which are incorporated herein by reference, the undersigned bidder proposes to furnish all labor, equipment, and materials and perform all work necessary for construction of this project, in accordance with the Plans and Specifications dated **February 1, 2023**, and the Addenda noted below, as prepared by **Hughes Associates Architects & Engineers**, for the consideration of the following amount:

**BASE BID (including the following parts):**

**PART A.**

Lump sum price for construction of the building within a perimeter extending 5 feet from the walls of the building, complete, except for the excavation of additional unsuitable material in PART C, excavation of rock material in PART D and excavation of rock material at trenches in PART E, and in accordance with the Plans and Specifications:

**PART A =** \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

**PART B.**

Lump sum price for the sitework beyond the 5 feet building perimeter (except for work described in PARTS C, D and E) complete and in accordance with the Plans and Specifications:

**PART B =** \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

Base Bids for PARTS C, D and E shall be based on the estimated quantities indicated to be provided complete and in accordance with the applicable portions of the plans and specifications. Payment amounts for each of these items will be based on the actual quantities authorized, provided and approved times the unit prices indicated by the bidder. The final contract amount shall be adjusted upward or downward based on the actual payment amounts versus the bid amounts for PARTS C, D and E.

**PART C. EXCAVATION OF ADDITIONAL UNSUITABLE MATERIAL**

**Excavation of unsuitable material**, where authorized or directed, below or in addition to the levels required for the Work in PARTS A and B, proper disposal off-site of unsuitable material and backfill with compacted material per specifications. (Price per cubic yard) Final amount shall be adjusted upward or downward based on actual quantity authorized.

Estimated quantity of (100) cy @ \$ \_\_\_\_\_ per cy = \_\_\_\_\_

**PART C =** \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

**PART D. EXCAVATION OF ROCK MATERIAL**

**Excavation of ROCK material**, where authorized or directed, proper disposal off-site of excess material and backfill with compacted material per specifications. (Price per cubic yard) Final amount shall be adjusted upward or downward based on actual quantity authorized.

Estimated quantity of (50) cy @ \$ \_\_\_\_\_ per cy = \_\_\_\_\_

**PART D =** \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

**PART E. EXCAVATION OF ROCK MATERIAL AT TRENCHES**

**Excavation of ROCK material at trenches**, where authorized or directed, proper disposal off-site of excess material and backfill with compacted trench fill material per specifications. (Price per cubic yard) Final amount shall be adjusted upward or downward based on actual quantity authorized.

Estimated quantity of (50) cy @ \$ \_\_\_\_\_ per cy = \_\_\_\_\_

**PART E =** \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

**TOTAL BASE BID AMOUNT (Sum of PARTS A, B, C, D & E) IS:**

\_\_\_\_\_ DOLLARS (\$ \_\_\_\_\_).

Contract award will be based on the **TOTAL BASE BID AMOUNT shown above** (including any properly submitted bid modifications). See **DGS-30-055 (CO-7A) Instructions to Bidders (Award of Contract)**.

The bidder has relied upon the following public historical climatological records:  
**National Weather Service – Lynchburg Regional Airport, Station ID KLYH for Forest, VA.**

*Code of Virginia, § 2.2-4376.2* shall be applicable to the Work of the Contract.

The undersigned understands that time is of the essence and agrees that the time for Substantial Completion of the entire project shall be **180** consecutive calendar days from the date of commencement of the Work as specified in the Notice to Proceed. Normal working hours shall be **7:00 AM to 3:30 PM Monday through Friday**. Final Completion shall be achieved within 30 consecutive calendar days after the date of Substantial Completion as determined by the A/E.

Acknowledgment is made of receipt of the following Addenda

No. 1 Date: \_\_\_\_\_ Signature \_\_\_\_\_

No. 2 Date: \_\_\_\_\_ Signature \_\_\_\_\_

No. 3 Date: \_\_\_\_\_ Signature \_\_\_\_\_

No. 4 Date: \_\_\_\_\_ Signature \_\_\_\_\_

No. 5 Date: \_\_\_\_\_ Signature \_\_\_\_\_

No. 6 Date: \_\_\_\_\_ Signature \_\_\_\_\_



No. 7 Date: \_\_\_\_\_ Signature \_\_\_\_\_

No. 8 Date: \_\_\_\_\_ Signature \_\_\_\_\_

No. 9 Date: \_\_\_\_\_ Signature \_\_\_\_\_

No. 10 Date: \_\_\_\_\_ Signature \_\_\_\_\_

**Questions Pertaining to This IFB:**

**Any questions pertaining to the IFB should be submitted to the Contract Officer using the contact information below:**

Mr. Joshua Saunders

Phone: (804) 729-6845

Email: [Joshua.saunders@vdot.virginia.gov](mailto:Joshua.saunders@vdot.virginia.gov)

If notice of acceptance of this bid is given to the undersigned within 30 days after the date of opening of bids, or any time thereafter before this bid is withdrawn, the undersigned will execute and deliver a contract in the prescribed form (Commonwealth of Virginia Contract Between Owner and Contractor, Form CO-9) within 10 days after the contract has been presented to him for signature. The required payment and performance bonds, on the forms prescribed, shall be delivered to the Owner along with the signed Contract.

Immigration Reform and Control Act of 1986: The undersigned certifies that it does not and shall not during the performance of the Contract for this project violate the provisions of the Federal Immigration Reform and Control Act of 1986, which prohibits employment of illegal aliens, or knowingly employ an unauthorized alien as defined in the Federal Immigration Reform and Control Act of 1986.

DISQUALIFICATION OF CONTRACTORS: By signing this bid or proposal, the undersigned certifies that this Bidder or any officer, director, partner or owner is not currently barred from bidding on contracts by any Agency of the Commonwealth of Virginia, or any public body or agency of another state, or any agency of the federal government, nor is this Bidder a subsidiary or affiliate of any firm/corporation that is currently barred from bidding on contracts by any of the same. We have attached an explanation of any previous disbarment(s) and copies of notice(s) of reinstatement(s).

Either the undersigned or one of the following individuals, if any, is authorized to modify this bid prior to the deadline for receipt of bids by writing the modification and signing his name on the face of the bid, on the envelope in which it is enclosed, on a separate document, or on a document which is telefaxed to the Owner.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I certify that the firm name given below is the true and complete name of the bidder and that the bidder is legally qualified and licensed by the Virginia Department of Professional and Occupational Regulation, Board for Contractors, to perform all Work included in the scope of the Contract.

Virginia License No.: \_\_\_\_\_

Bidder: \_\_\_\_\_  
(Name of Firm)

Contractor Class: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Specialty: \_\_\_\_\_

Valid until: \_\_\_\_\_

FEIN/SSN: \_\_\_\_\_

Title: \_\_\_\_\_

E-Mail Address \_\_\_\_\_

If General Partnership (List Partners' Names)

Business Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

FAX # \_\_\_\_\_

Telephone # \_\_\_\_\_

If Corporation, affix Corporate Seal &  
list State of Incorporation

State: \_\_\_\_\_

(Affix Seal)

Virginia State Corporation Commission ID No.: \_\_\_\_\_; or

If Contractor is a foreign business entity not required to be authorized to transact business in the Commonwealth under Titles 13.1 or 50 of the Code of Virginia, or as otherwise required by law, please provide an explanation as to why such entity is not required to be so authorized: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Contractor's Proposed Small Business Participation:**           % \_\_\_\_\_  
**Contractor insert percentage required**

Evidence of compliance reporting for your Small Business Subcontracting Plan and any additional subcontracting shall be entered directly through the Subcontractor Payment Reporting tool accessible in your eVA Supplier Account. The Contract Officer will provide the Reporting Job Aid upon request from the awarded Contractor.

**COMMONWEALTH OF VIRGINIA**



**GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT**

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**PLEASE NOTE:** These General Conditions of the Construction Contract (CO-7) (“General Conditions”), have been created specifically for the use of agencies of the Commonwealth of Virginia, which may not alter any provisions without the express written approval of the Virginia Department of General Services, Division of Engineering and Buildings. The General Conditions have significant legal implications and shall not be altered or modified. Nothing in the General Conditions shall be amended or deleted or its intent changed, except by an approved and properly issued Supplemental General Conditions. The Commonwealth of Virginia makes no representation as to their suitability for any other purpose. Note: Governmental entities not subject to DGS purview intending to modify the General Conditions for their use should consult with their legal counsel.

## 1. DEFINITIONS

Whenever used in in the Contract Documents, the following terms have the meanings indicated, which are applicable to both the singular and plural variations thereof:

**Agency:** The Agency, institution or department which is a party to the Contract. For purposes of the Contract, the term Owner shall include such Agency, whether or not the Agency owns the site or the building.

**A/E Services:** The entirety of the services required of the A/E pursuant to the A/E's contract with the Owner for the Project.

**As-Built Drawings:** The As-Built Drawings is a set of all Drawings, Specifications, addenda, approved Shop and setting Drawings, Change Orders and other modifications which are updated by the Contractor throughout the performance of the Work to contemporaneously record all changes and variations made during construction. The representation of such variations shall be neatly and clearly marked in color and shall include such supplementary notes, symbols, legends, and details as may be necessary to clearly show the as-built construction of the Work.

**Architect/Engineer ("A/E"):** The Virginia licensed Architect or Engineer that contracts with the Owner to provide the A/E Services for the Project. The A/E is a separate contractor and not an agent of the Owner. The term includes any subcontractors, associates or consultants employed by the A/E to assist in providing the A/E Services.

**Beneficial Occupancy:** The time, following Substantial Completion, at which the Project or portion thereof, is sufficiently complete and systems operational such that the Owner could, after obtaining necessary approvals and certificates, occupy and utilize the space for its intended use. Guarantees and warranties applicable to that portion of the Work begin on the date the Owner accepts and occupies the Project, or a portion thereof, unless otherwise specified in the Supplemental General Conditions or by separate agreement.

**Change Order:** A document (CO-11) issued on or after the effective date of the Contract which is agreed to by the Contractor and approved by the Owner, and which authorizes an addition, deletion or revision in the Work, including any adjustment in the Contract Price and/or the Contract Completion Date. The term Change Order shall also include initiating and confirming change orders issued pursuant to Section 38(a)(3). A Change Order, once signed by all parties, is incorporated into and becomes a part of the Contract.

**Code of Virginia:** *Code of Virginia* (1950), as amended. Sections of the Code referred to herein are noted by § xx-xx.

**Commissioner of Labor and Industry:** The Commonwealth of Virginia Commissioner of Labor and Industry.

**Construction:** The term used to include new construction, reconstruction, renovation, restoration, major repair, demolition and all similar work upon buildings and ancillary facilities, including any draining, dredging, excavation, grading or similar work upon real property.

**Contract:** The Contract between Owner and Contractor, (CO-9 series) and the Contract Documents incorporated therein.

**Contract Completion Date:** The date by which the Work must achieve Substantial Completion. The Contract Completion Date is established in the Notice to Proceed, based on the Time for Completion, or set forth as a specific date in the Contract.

**Contract Documents:** The Contract and any documents expressly incorporated therein. Such incorporated documents customarily include the bid submitted by the Contractor, the General Conditions, any Supplemental General Conditions, any Special Conditions, the Plans and the Specifications, and all modifications, including addenda and subsequent Change Orders.

**Contract Price:** The total compensation payable to the Contractor for performing the Work in accordance with the Contract Documents, subject to modification by Change Order.

**Contractor:** The person or entity with whom the Owner has entered into the Contract for the Work.

**Critical Path:** The longest continuous sequential duration of dependent activities from the Date of Commencement to the Contract Completion Date that defines the minimum overall time necessary to complete the Project, such that a delay of any activity along the Critical Path will result in a delay of the Contract Completion Date unless the duration of a subsequent activity on the Critical Path is reduced to offset the delay and maintain the Contract Completion Date.

**Date of Commencement:** The date as indicated in the written Notice to Proceed, the receipt of the earliest Building Permit, or a date mutually agreed to between the Owner and Contractor in writing, whichever is the latest.

**Day:** Calendar day unless otherwise noted.

**Defective:** An adjective which, when modifying the word Work, refers to Work that is unsatisfactory, faulty, deficient, does not conform to the Contract Documents or does not meet the requirements of inspections, standards, tests or approvals required by the Contract Documents, or Work that has been damaged prior to the A/E's recommendation of Final Payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion or Beneficial Occupancy).

**DGS:** Virginia Department of General Services.

**Drawing:** A page or sheet of the Plans which presents a graphic representation, usually drawn to scale, showing the technical information, design, location, and dimensions of various elements of the Work. The graphic representations include, but are not limited to, plan views, elevations, transverse and longitudinal sections, large and small scale sections and details, isometrics, diagrams, schedules, tables and/or pictures.

**DSBSD:** Virginia Department of Small Business and Supplier Diversity.

**Emergency:** Any unforeseen situation, combination of circumstances, or a resulting state that poses imminent danger to health, life or property.

**Field Order:** A written order issued by the A/E which clarifies or explains the Plans or Specifications, or any portion or detail thereof, without changing the design, the Contract Price, the Time for Completion or the Contract Completion Date.

**Final Completion:** Completion and full performance of all Work in accordance with the terms and requirements of the Contract Documents, including the completion of all items identified on punch lists generated through the inspections set forth in Section 44(b) and submission of all information, manuals, warranties and documentation required by the Contract.

**Final Completion Date:** The date of the Owner's acceptance of the Work following Final Completion.

**Final Compliance Report:** A report where the Contractor shall certify and report on its compliance with the Small Business Procurement Plan, submitted by the Contractor in its Bid for the Contract, to the Owner through DGS' eVA system

**Final Payment:** The final payment that the Contractor receives pursuant to the applicable provisions of Section 36, except in the event no final payment is made due to termination of the Contract under either Sections 41 or 42. In the event of a termination for cause under Section 41, the Final Payment shall be when the termination became effective. In the event of a termination for convenience under Section 42, the Final Payment shall be either the payment of compensation for termination that the Contractor receives according to the provisions of Section 42(a), or the Owner's determination that no compensation for termination is due the Contractor under Section 42(a), as the case may be.

**Float:** The excess time included in a construction schedule to accommodate such items as inclement weather and associated delays, equipment failures, and other such unscheduled events. It is the contingency time associated with a path or chain of activities and represents the amount of time by which the early finish date of an activity may be delayed without impacting the Critical Path and delaying the Contract Completion Date. Any difference in time between the Contractor's approved early completion date and the Contract Completion Date shall be considered a part of the Float.

**Float, Free:** The time (in Days) by which an activity may be delayed or lengthened without impacting the start day of any successor activity.

**Float, Total:** The difference (in Days) between the maximum time available within which to perform an activity and the duration of an activity. It represents the time by which an activity may be delayed or lengthened without impacting the Contract Completion Date.

**General Conditions:** The General Conditions of the Construction Contract (CO-7 series).

**Limited Renovation:** Renovations that do not involve structural work (including, but not limited to, foundations, supports, beams, exterior roof supports, load bearing walls) and that do not involve Hot Work (as defined by the Virginia Statewide Fire Prevention Code) with the exception of brazing, soldering, and grinding.

**Major Renovation:** Renovations that do not meet the definition of Limited Renovation.

**Notice:** Notice required by the Contract shall be given in writing to the email address or physical delivery location identified in the Contract Documents for receipt of Notice by the receiving party. A Notice is deemed to have been properly given and effective at the time such Notice is: (i) deposited with a nationally recognized overnight delivery service using no more than two (2) business day delivery service for delivery to the Notice address; (ii) hand delivered to the Notice address; (iii) enclosed in a postage prepaid envelope addressed to the Notice address and delivered to a United States Postal Service for delivery by prepaid certified or registered mail; or (iv) sent via email to the email address identified for Notice in the Contract Documents.

**Notice to Proceed:** A written Notice given by the Owner to the Contractor fixing the date on which the Time for Completion will commence for the Contractor to begin the execution of the Work. The Notice to Proceed will identify the Contract Completion Date if not otherwise established by the Contract.

**Owner:** The public body with whom the Contractor has entered into the Contract for the Work. The term Owner shall also mean the Agency.

**Person:** This term includes any individual, corporation, partnership, association, company, business, trust, joint venture, or other legal entity.

**Plans:** The term used to describe the group or set of project-specific Drawings which are included in the Contract Documents.

**Prevailing Wage Rate:** Prevailing Wage Rate means that rate, amount, or level of wages, salaries, benefits and other remuneration prevailing for a classification of mechanics, laborers, or workers employed

for the same work in the same trade, craft or occupation in the locality of the Project as determined by the Commissioner of Labor and Industry.

**Project:** The term used instead of the specific or proper assigned title of the entire undertaking which includes, but is not limited to, the Work and the A/E Services.

**Project Inspector:** One or more persons employed by the Owner to inspect the Work for the Owner and/or to document and maintain records of activities at the Site to the extent required by the Owner. The scope of the Project Inspector's authority with respect to the Contractor is limited to that indicated in Section 16 (e) and (f) of the General Conditions and as supplemented by the Owner in writing to the Project Inspector and to the Contractor.

**Project Manager:** The Project Manager shall be the Owner's designated representative on the Project. The Project Manager shall be the person through whom the Owner generally conveys written decisions and instructions. All Notices to the Owner and all information required to be conveyed to the Owner shall be conveyed to the Project Manager unless otherwise stated in the Contract. The scope of the Project Manager's authority is limited to that authorized by the Owner. The Owner may change the Project Manager from time to time and may, in the event that the Project Manager is absent, disabled or otherwise temporarily unable to fulfill their duties, appoint an interim Project Manager.

**Provide:** Shall mean furnish and install ready for its intended use.

**Record Drawings:** Record Drawings are a final compilation set of drawings showing the "as built" condition of the Work, including all conditions, locations and dimensions based on the Contractor's As-Built Drawings. The Record Drawings shall contain the Plans, Specification, Addenda, approved shop drawings, and any other information needed to show the final condition of the work, actual location of piping and utilities, the depths of pilings or caissons if pilings or caissons were in the construction, and the integration of all Change Orders to the Work.

**Recycled:** Equipment, materials, and accessories which have been previously used and that have been processed to form a new product deemed an equal per Section 26.b.

**Service Disabled Veteran-Owned Business:** A business that meets the definition of "Service disabled veteran business" as set forth in *Code of Virginia*, § 2.2-4310.

**Schedule of Values:** That portion of Form CO-12 prepared by the Contractor and acceptable to the Owner which indicates the portion of the Contract Price to be paid for each trade or major component of the Work.

**Shop Drawings:** The drawings, diagrams, illustrations, schedules, installation descriptions and other data prepared by or for the Contractor to provide detailed information for the fabrication, location, erection, installation, connection and methodology associated with the Work. Shop Drawings are intended to aid in the preparation and installation of materials and to ascertain that the materials proposed by the Contractor conform to the requirements of the Contract Documents.

**Site:** The location at which the Work is performed or is to be performed.

**Small Business:** A business certified as a small business by the DSBSD.

**Small Business Procurement Plan:** The proposed type and percentage of small business participation in the Total Base Bid Amount submitted by the Contractor as part of its Bid.

**Special Conditions:** That part of the Contract Documents which describes special or additional requirements or procedures applicable to the Project. The Special Conditions do not amend or supersede the General Conditions.



**Specifications:** That part of the Contract Documents containing the written administrative requirements and the technical descriptions of materials, equipment, construction systems, standards, and workmanship for the Work.

**Subcontractor:** A person or firm having a direct contract with Contractor or with any other Subcontractor for the performance of the Work. Subcontractor includes any person or firm who provides on-Site labor but does not include a Supplier.

**Submittals:** All Shop, fabrication, setting and installation drawings, diagrams, illustrations, schedules, samples, and other data required by the Contract Documents which are specifically prepared by or for the Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by the Contractor to illustrate material or equipment conformance of some portion of the Work with the requirements of the Contract Documents. Submittal as used herein includes Shop Drawings.

**Substantial Completion:** The stage in the progress of the Work at which the Owner agrees that the Work or a specific portion thereof, is sufficiently complete, in accordance with the Contract Documents, so that it can be utilized by the Owner for the purposes for which it was intended. The Owner at its sole discretion may, after obtaining the necessary approvals and certificates, take Beneficial Occupancy at this time or choose to wait to occupy until after Final Completion is achieved.

**Supplemental General Conditions:** An amendment or modification which amends or supplements the General Conditions.

**Supplier:** A manufacturer, fabricator, distributor, supplier or vendor who provides material or equipment for the Project but does not provide on-Site labor.

**SWaM/SDV Business:** All subcategories of Small Businesses certified by the DSBSD including Micro Business, Minority-Owned Business, Service-Disabled Veteran-Owned Business, Small Business, and/or Women-Owned Business together as a group.

**Time for Completion:** The number of consecutive Days following the Date of Commencement within which the Contractor must achieve Substantial Completion of the Work in accordance with the Contract Documents.

**Total Contract Amount:** The total compensation payable to the Contractor for performing the Contract, subject to modification by Change Order.

**Underground Facilities:** All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which are or have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

**Work:** The construction and services required by the Contract Documents, whether completed or partially completed, including, but not limited to, furnishing labor, furnishing and incorporating materials and equipment into the Construction. The Work includes the entire completed Construction, or the various separately identifiable parts thereof, required to be provided under the Contract Documents or which may reasonably be expected to be provided as part of a complete, code compliant and functioning system for those systems depicted in the Plans and Specifications.

## 2. CONTRACT DOCUMENTS

The Contract Documents consist of the Contract and all other documents identified therein as Contract Documents as more precisely defined above.

### 3. LAWS AND REGULATIONS

- a. The Contractor shall comply with the Virginia Uniform Statewide Building Code and all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work and shall give all notices required thereby. The Contractor shall assure that all Subcontractors and tradespeople who perform Work on the Project are properly licensed by the Department of Professional and Occupational Regulation as required by Title 54.1, Chapter 11, and Article 1 of the *Code of Virginia* and by applicable regulations.
- b. This Contract and all other contracts and Subcontracts are subject to the provisions of Article 3, Chapter 4, Title 40.1, *Code of Virginia*, relating to labor unions and the “right to work.” The Contractor and its Subcontractors, whether residents or nonresidents of the Commonwealth, who perform any Work related to the Project shall comply with all of the said provisions.
- c. IMMIGRATION REFORM AND CONTROL ACT OF 1986: By signing this Contract, the Contractor certifies that it does not and shall not during the performance of this Contract knowingly employ an unauthorized alien as defined in the Federal Immigration Reform and Control Act of 1986, or otherwise violate its provisions.
- d. E-VERIFY PROGRAM: Pursuant to *Code of Virginia*, § 2.2-4308.2, any employer with more than an average of 50 employees for the previous 12 months entering into a contract in excess of \$50,000 with any agency of the Commonwealth to perform work or provide services pursuant to such contract shall register and participate in the E-Verify program to verify information and work authorization of its newly hired employees performing work pursuant to such public contract. Any such employer who fails to comply with these provisions may be debarred from contracting with any agency of the Commonwealth for a period up to one year. Such debarment may cease upon the employer’s registration and participation in the E-Verify program. If requested, the employer shall present a copy of their Maintain Company page from E-Verify to prove that they are enrolled in E-Verify.
- e. In performing the Work under this Contract, the Contractor shall comply with the provisions of all rules and regulations governing safety as adopted by the Safety Codes Commission of the Commonwealth of Virginia and as issued by the Department of Labor and Industry under Title 40.1 of the *Code of Virginia*. Inspectors from the Department of Labor and Industry shall be granted access to the Work for inspection without first obtaining a search or administrative warrant.
- f. Building Permit: Because this Project is on Commonwealth of Virginia property, codes or zoning ordinances of local political subdivisions do not apply to Work at the Site. The Virginia Uniform Statewide Building Code applies to the Work and is administered by the Building Official for State-owned buildings and real property. The Building Permit will be obtained and paid for by the Owner. All other permits, local license fees, business fees, taxes, or similar assessments imposed by the appropriate political subdivision and the Department of Environmental Quality shall be obtained and paid for by the Contractor. See Section 25 of these General Conditions for utility connection fees and services.
- g. The Contractor shall include in each of its Subcontracts a provision requiring each Subcontractor to include or otherwise be subject to the same payment and interest requirements in Subsections (a), (b), and (c) of Section 37 of these General Conditions with respect to each lower-tier Subcontractor and Supplier.
- h. The Contractor, if not licensed as an asbestos abatement contractor in accordance with *Code of Virginia*, § 54.1-514, shall have all asbestos-related Work performed by Subcontractors who are duly licensed as asbestos contractors for the Work required.

- i. Lead-Based Paint Activities: If the Contract Documents indicate that lead-based paint is present on existing materials, components, or surfaces, the Contractor shall conform to the following:
  - 1. The requirements set forth in 40 CFR 745.233 – Lead-Based Paint Activities Requirements in selecting and performing the means, methods and procedures for performing the Work. This includes, but is not limited to, training of personnel, lead abatement, encapsulation of lead-containing materials, removal and handling of lead-containing materials, and methods of disposal.
  - 2. The requirements for employee protection contained in 29 CFR Part 1926, Subpart D, and the requirements for record-keeping contained 29 CFR Part 1910.
  - 3. The Virginia Department of Labor and Industry’s (DLI) Regulation Concerning Certified Lead Contractors Notification, Lead Project Permits and Permit Fees published in the Virginia Administrative Code, 16 VAC25-35, requiring, among other things, that a permit be issued to the lead abatement contractor, or any subsequent regulation issued by DLI pertaining to lead-based paint abatement.
- j. If the Contractor violates laws or regulations that govern the Project, the Contractor shall take prompt action to correct or abate such violation and shall indemnify and hold the Owner harmless against any fines and/or penalties that result from such violation. The Contractor also shall indemnify and hold the Owner harmless against any third-party claims, suits, awards, actions, causes of action or judgments, including but not limited to attorney’s fees and costs incurred thereunder, that arise or result from Contractor’s violation of laws or regulations.
- k. If the Work includes any land-disturbing activities, the Contractor shall have on-Site an individual certified by the Department of Environmental Quality as a Responsible Land Disturber in accordance with *Code of Virginia*, § 62.1-44.15:51.
- l. Unless otherwise specified in the Supplemental General Conditions, the Contractor is neither required nor prohibited from entering into or adhering to agreements with one or more labor organizations, or otherwise discriminating against Subcontractors for becoming or refusing to become, or remaining signatories to or otherwise adhering to, agreements with one or more labor organizations. This section does not prohibit Contractor or Subcontractors from voluntarily entering into agreements with one or more labor organizations. Both the Agency and Contractor are entitled to injunctive relief to prevent any violation of this section.

This section does not apply to any public-private agreement for any construction in which the private body, as a condition of its investment or partnership with the state agency, requires that the private body have the right to control its labor relations policy and perform all work associated with such investment or partnership in compliance with all collective bargaining agreements to which the private party is a signatory and is thus legally bound with its own employees and the employees of its contractors and subcontractors in any manner permitted by the National Labor Relations Act, 29 U.S.C. § 151 *et seq.*, or the Railway Labor Act, 45 U.S.C. § 151 *et seq.*

This section does not prohibit an employer or any other person covered by the National Labor Relations Act or the Railway Labor Act from entering into agreements or engaging in any other activity protected by law.

This section shall not be interpreted to interfere with the labor relations of persons covered by the National Labor Relations Act or the Railway Labor Act.

- m. Payment of Prevailing Wages Pursuant to Virginia Code 2.2-4321.3

*Code of Virginia* § 2.2-4321.3 and the following requirements shall be applicable to the Work of the Contract if the Contract Price is greater than \$250,000.00:

1. The Contractor agrees that all remuneration to any individual providing labor for the Project or the Work as a mechanic, laborer, worker or equivalent shall be paid at a rate not less than the Prevailing Wage Rate beginning upon the individual's first day of work at or for the Project.
  2. Upon award of the Contract, the Contractor shall certify, under oath, to the Commissioner of Labor and Industry the pay scale for each craft and trade to be employed for, or to provide labor for, the Project or the Work by the Contractor and any Subcontractors. The Contractor's certification shall include all information required by *Code of Virginia* § 2.2-4321.3(G). The Contractor shall provide a copy of this certification to the Owner at the time it is provided to the Commissioner of Labor and Industry.
  3. The Contractor shall ensure that each individual providing labor as a mechanic, laborer, worker or equivalent shall be accurately classified in conformance with the Prevailing Wage Rate determinations.
  4. The Contractor and all Subcontractors shall keep, maintain, and preserve all records relating to the occupation, work classification, wages paid to and hours worked for each individual providing labor for the Project or the Work as a mechanic, laborer, worker or equivalent in a manner which complies with the requirements of *Code of Virginia* § 2.2-4321.3(H). The Contractor and all Subcontractors shall retain these and any other required payroll records for the period required by *Code of Virginia* § 2.2-4321.3(H). The Contractor and its Subcontractors shall make available to the Owner all records required by *Code of Virginia* § 2.2-4321.3(H) for inspection and copying within five (5) days of Owner's request.
  5. The Contractor and all Subcontractors shall post all Prevailing Wage Rates applicable to the Project and the Work in a prominent and easily accessible place at the Site. The Contractor and all Subcontractors shall timely make all postings, updates to postings, and certification required by *Code of Virginia* § 2.2-4321.3(I). The Contractor shall provide the Owner with a copy of each certification made to the Commissioner of Labor and Industry pursuant to *Code of Virginia* § 2.2-4321.3(I) at the time the certification is provided to the Commissioner of Labor and Industry.
  6. The Contractor shall indemnify and hold harmless the Owner from any fines, demands, claims, suits and damages, including any attorney's fees incurred by the Owner, resulting from or relating to the Contractor's or any Subcontractor's failure to pay the Prevailing Wage to a mechanic, laborer, worker or equivalent individual or to comply with the requirements of *Code of Virginia* § 2.2-4321.3.
- n. *Code of Virginia*, § 2.2-4376.2 shall be applicable to the Work of the Contract.

#### 4. NONDISCRIMINATION

- a. Contractor shall comply with the Federal Civil Rights Act of 1964, as amended, the Virginia Fair Employment Contracting Act of 1975, as amended, the Virginia Human Rights Act, as amended, and the laws of the Commonwealth of Virginia and all Executive Orders in effect at the time of the Work which safeguard individuals from unlawful discrimination in employment.
- b. *Code of Virginia* § 2.2-4311 and executive orders currently in effect shall be applicable to the Work of the Contract. During the performance of this Contract, the Contractor agrees as follows:

1. The Contractor shall not discriminate against any employee or applicant for employment, subcontracting, and delivery of goods and services because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law or executive order relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
  2. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such Contractor is an equal opportunity employer.
  3. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.
  4. The Contractor shall include the provisions of the foregoing subparagraphs 1, 2 and 3 in every Subcontract or purchase order over \$10,000, so that the provisions will be binding upon each Subcontractor and Supplier.
- c. *Code of Virginia*, § 2.2-4201 shall be applicable to the Work of the Contract. During the performance of this Contract, the Contractor agrees as follows:
1. The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause, including the names of all contracting agencies with which the Contractor has contracts over \$10,000.
  2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that Contractor is an equal opportunity employer. However, notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this chapter
  3. If the Contractor employs more than five (5) employees, the Contractor shall: (i) provide annual training on the Contractor's sexual harassment policy to all Contractor's supervisors and employees providing services in the Commonwealth of Virginia, except such supervisors or employees who are required to complete sexual harassment training provided by the Commonwealth of Virginia Department of Human Resource Management; and (ii) post the Contractor's sexual harassment policy in: (a) a conspicuous public place in each building located in the Commonwealth that the Contractor owns or leases for business purposes; and (b) the Contractor's employee handbook.
  4. The Contractor shall include the provisions of the foregoing subparagraph 1, 2 and 3 in every Subcontract and purchase order over \$10,000, so that the provisions will be binding upon each Subcontractor and Supplier.
- d. Where applicable, the Virginians with Disabilities Act and the federal Americans with Disabilities Act shall apply to the Contractor and all Subcontractors and Suppliers.
- e. The Owner does not discriminate against faith-based organizations as defined in *Code of Virginia* § 2.2-4343.1(B).

**5. PROHIBITION OF ALCOHOL AND OTHER DRUGS**

- a. The Contractor shall establish a written policy to maintain and enforce a drug-free workplace, to specify actions that will be taken against persons for violations of the policy, and to require that such policy be binding on each of its employees, Subcontractors, and Suppliers performing Work of the Contract.
- b. The Contractor's policy shall prohibit the following acts by all Contractor, Subcontractor, and Supplier personnel at the Site:
  - 1. The manufacture, distribution, dispensation, possession, or use of a controlled substance or marijuana, except possession and medically prescribed use of prescription drugs; and
  - 2. The impairment of judgment or physical abilities due to the use of a controlled substance or marijuana, including impairment from prescription drugs.
- c. The Contractor shall post a copy of this policy in a conspicuous place at the Site and assure that all personnel, including potential hires, are advised of the policy. A violation of this policy will be recognized as a breach of Contract and may result in termination of the Contract.
- d. The Contractor shall include in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace.
- e. The Contractor shall include the foregoing provisions as binding upon each Subcontractor and Supplier in every subcontract or purchase order over \$10,000.
- f. For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

**6. TIME FOR COMPLETION**

- a. The Contractor shall achieve Substantial Completion on or before the Contract Completion Date. Unless otherwise specified, the Contractor shall achieve Final Completion within thirty (30) Days after the Contract Completion Date.
- b. The Contractor acknowledges and agrees that the Owner is relying upon the Time for Completion and Contract Completion Date for planning the use and Beneficial Occupancy of the Work and for all other purposes. If the Contractor fails to achieve Substantial Completion by the Contract Completion Date, the Contractor shall be subject to payment of actual damages incurred by the Owner or liquidated damages, if provided for in the Contract.
- c. The Contractor, in submitting its bid or proposal, acknowledges that the Time for Completion is a reasonable duration and period for performing the Work and that it has taken into consideration normal weather conditions for the period of performance. Normal weather does not mean statistically average weather, but rather means a range of weather patterns which might be anticipated based on weather conditions and events for the past ten (10) years. Normal weather conditions shall be determined from the public historical records available, including the U.S. Department of Commerce, Local Climatological Data Sheets, National Oceanic and Atmospheric Administration / Environmental Data and Information Service, National Climatic Center and National Weather Service. The data sheets to be used shall be those for the locality or localities closest to the Site. No additional compensation, costs or damages will be paid to the Contractor

because of normal weather conditions, including normal adverse weather to be anticipated during the Project. An extension of time for abnormal adverse weather conditions which directly impact the Work will be considered by the Owner upon under the following conditions, all of which must be strictly complied with and demonstrated by the Contractor:

1. A request for extension of time-based on abnormal adverse weather conditions must be made in writing within fourteen (14) Days of the completion of the calendar month during which the abnormal adverse weather conditions impacted the Work at the Site. The request for additional time shall be substantiated by weather data collected during the period of delay at the Site. Said data must demonstrate an actual departure from weather conditions that could have been anticipated at the Site during the dates in question.
2. The abnormal adverse weather must have caused a delay to the Contract Completion Date as a result of a delay to the Critical Path as depicted on the accepted "critical path method" schedule or the approved bar graph schedule current at the time of the weather event. No extension will be considered for any portion of any delay which consumes only Float.
3. All of the evidence and data supporting the request (including both historical data and the recordings at the Site during the time of delay) must be furnished to the Owner before the end of the calendar month following the month for which the request is made.

Compliance with the requirements of this section is a condition precedent to the Contractor's entitlement to any change or adjustment to the Contract Completion Date for impacts from abnormal weather conditions.

- d. The Contractor's execution of the Contract is a representation and agreement that the Contractor has visited the Site and reviewed the requirements of the bid documents, the Contract Documents, local conditions, availability of materials, equipment, and labor, the reasonable time required for the Owner to respond to Submittals, and any other factors which may affect the performance of the Work, and has taken all these factors into consideration in submitting its bid and executing this Contract.

## 7. CONDITIONS AT SITE

- a. The Contractor shall have visited the Site prior to bidding or submitting its proposal and is totally responsible for having ascertained pertinent local conditions such as location, accessibility and general character of the Site, and the character and extent of existing conditions, improvements and work within or adjacent to the Site. The Contractor shall not submit any claims or any request for adjustments of the Contract Price or Contract Completion Date which result from its failure to consider such conditions.
- b. If in the performance of the Work the Contractor encounters (i) hidden physical conditions of a building being modified which are materially different from those ordinarily encountered or generally recognized as inherent in the activities being performed or (ii) subsurface or concealed latent conditions which are materially different from those frequently present in the locality or from those indicated in the Contract Documents, the Contractor shall promptly provide Notice to the Owner and A/E before the conditions are disturbed and not later than seven (7) Days after discovery. The A/E shall promptly review the conditions and propose such changes or adjustments, if any, in the Contract Documents that may be necessary to address the conditions. The Contractor must request any change in the Contract Price or Contract Completion Date for such conditions pursuant to the applicable requirements in Sections 38, 39, and 43 of these General Conditions. Compliance with the requirements of this section is a condition precedent to the Contractor's entitlement to any change or adjustment in the Contract Price or Contract Completion Date as a result of such Site conditions.

- c. If the Contractor, during the course of the Work, observes the existence of any material which he knows, should know, or has reason to believe is hazardous to human health, the Contractor shall promptly notify the Owner in writing before the material is disturbed further or the affected work is performed. The Owner will provide the Contractor with instructions regarding the disposition of the material. The Contractor shall not perform any Work involving the material or any Work causing the material to be less accessible prior to receipt of special instructions from the Owner. The Contractor must request any change in the Contract Price or Contract Completion Date for such conditions pursuant to the applicable requirements in Sections 38, 39 and 43 of these General Conditions. Compliance with the requirements of this section is a condition precedent to the Contractor's entitlement to any change or adjustment in the Contract Price or Contract Completion Date as a result of such Site conditions.

## 8. CONTRACT SECURITY

- a. For contracts with a value exceeding Five Hundred Thousand Dollars (\$500,000) or as required by the Owner on the CO-9, the Contractor shall deliver to the Owner or its designated representative, a Commonwealth of Virginia Standard Performance Bond, DGS-30-084 (CO-10) and a Commonwealth of Virginia Standard Labor and Material Payment Bond, DGS-30-088 (CO-10.1), each fully executed by the Contractor and one or more surety companies legally licensed to do business in Virginia and each in an amount equal to one hundred percent (100%) of the Contract Price. If more than one Surety executes a bond, each shall be jointly and severally liable to the Owner for the entire amount of the bond. Sureties shall be selected by the Contractor, subject to approval by the Owner. No payment on the Contract shall be due and payable to the Contractor until the bonds have been approved by the Owner and the Office of the Attorney General of Virginia. To facilitate review of the bonds by the Office of the Attorney General, the power of attorney from the surety company to its agent who executes the bond shall be attached to the bond, or, if not so attached, prior to the execution of the bonds by the surety, recorded in the Office of the Clerk of Court for the City of Richmond, Virginia, at the John Marshall Court Building, 400 North Ninth Street, Richmond, VA 23219.
- b. For the purposes of all Standard Labor and Material Payment Bonds entered into, the term "subcontractors" as used in § 2.2-4337(A)(2) of the *Code of Virginia* is interpreted to mean any Subcontractors at any tier who participated in the prosecution of the Work undertaken by the Contractor (referred to in § 2.2-4337(A)(2) of the *Code of Virginia* as the "prime contractor"), whether such Subcontractor had a direct contract with the Contractor (prime contractor) or another Subcontractor, regardless of whether there were one or more other intervening Subcontractors contractually positioned between it and the Contractor (prime contractor).
- c. *Code of Virginia* § 2.2-4338 allows for alternative forms of security in lieu of payment and/or performance bonds. No alternative forms of security shall be allowed unless approved in writing by Owner prior to Contractor's submission of its Bid or proposal.
- d. Mechanic's liens may not be filed or recorded on Owner, Agency, or Commonwealth property. The Contractor shall keep the Owner's property free and clear from all mechanic's liens. The Contractor shall, upon Notice from the Owner, cause any liens filed or recorded to be released within ten (10) Days from Notice at its cost and expense; and if the Contractor fails to do so, the Owner shall have the right, but not the obligation, to cause such lien to be released by bonding or otherwise, and the Contractor shall indemnify and hold harmless the Owner from all costs and expenses incurred or to be incurred as a result, including bond premiums, court costs and attorneys' fees arising from or related to such liens. At the Owner's option, it may withhold payment of any sums due the Contractor until any such liens are released, and may deduct such costs or expenses from any payment then due or thereafter becoming due from the Owner to the Contractor.



## 9. SUBCONTRACTS

- a. The Contractor shall, as soon as practicable after the signing of the Contract, notify the Owner and A/E in writing of the names of all Subcontractors proposed for the principal parts of the Work and of such others as the A/E may direct. Where the Specifications establish qualifications or criteria for Subcontractors, manufacturers, or individuals performing Work on the Project, the Contractor shall be responsible for ascertaining that those proposed meet the criteria or qualifications. The Contractor shall not employ any Subcontractor that the Owner may, within a reasonable time, object to as unsuitable. Neither the Owner nor the A/E shall direct the Contractor to contract with any particular Subcontractor unless provided in the Specifications or Invitation for Bids.
- b. The Owner may select a particular Subcontractor for a certain part of the Work and designate on the Invitation for Bids or Request for Proposal that the Subcontractor shall be used for the part of the Work indicated and that the Subcontractor has agreed to perform the Work for the subcontract amount stipulated on the bid or Proposal. The Contractor shall include the stipulated amount plus its markups in the bid or Proposal. In such case, the Contractor shall be responsible for that Subcontractor and its work and the Subcontractor shall be responsible to the Contractor for its work just as if the Contractor had selected the Subcontractor. If the Contractor has a reasonable objection to the Subcontractor designated, then the Contractor shall note the exception in its bid or proposal and the reason for the exception and maintain appropriate provisions for coordinating the work of the Subcontractor. The Owner, at its sole discretion, may accept the Contractor's bid or proposal with the exception noted and contract separately with the Subcontractor under the provisions of Section 10 of the Contract or designate a different Subcontractor.
- c. The Owner shall, on request, furnish to any Subcontractor, if practicable, the amounts of payments made to the Contractor, the Schedule of Values and Requests for Payment submitted by the Contractor, and any other documentation submitted by the Contractor which would tend to show what amounts are due and payable by the Contractor to the Subcontractor.
- d. The Contractor shall be fully responsible to the Owner for all acts and omissions of its agents and employees and all tiers of Subcontractors and Suppliers performing or furnishing any of the Work. Nothing in the Contract Documents shall create any contractual relationship between Owner or A/E and any Subcontractor, Supplier or other Person, nor shall it create any obligation on the part of Owner or A/E to pay for or to see to the payment of any moneys due any Subcontractor, Supplier or other Person, except as may otherwise be required by law.
- e. The Contractor shall be fully responsible for its invitees at the Site and for those of its Subcontractors, Suppliers, and their employees, including any acts or omissions of such invitees.
- f. The Contractor agrees that it is responsible for all dealings and coordination with Subcontractors and Suppliers, and their subcontractors, employees and invitees, including, but not limited to, the Subcontractors' or Suppliers' claims, demands, actions, disputes and similar matters unless specifically provided otherwise by the Contract or by statute.

## 10. SEPARATE CONTRACTS

- a. The Owner reserves the right to let other contracts in connection with the Project, the work under which may proceed simultaneously with the execution of this Contract. The Contractor shall afford separate contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work. The Contractor shall cooperate with them and shall take all reasonable action to coordinate its Work with that of separate contractors. If the Owner has listed other separate contracts in the Invitation for Bids or Requests for Proposal which it expects to proceed simultaneously with the Work of the Contractor, and has included the estimated timing of such other contracts in the Invitation for Bids or Requests for Proposal, the Contractor shall integrate the schedule of those separate contracts into its scheduling. The Contractor shall make

every reasonable effort to assist the Owner in maintaining the schedules for all separate contracts. If the work performed by a separate contractor is Defective or performed so as to prevent or threaten to prevent the Contractor from carrying out its Work according to the Contract, the Contractor shall immediately notify the Owner and the A/E upon discovering such conditions.

- b. If a dispute arises between the Contractor and any separate contractor(s) as to their responsibility for cleaning up the Site, the Owner may clean up and charge the cost thereof to the respective contractors in proportion to their responsibility. If the Contractor disputes the Owner's apportionment of clean-up costs, it shall be the Contractor's burden to demonstrate and prove the correct apportionment.

## 11. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE

- a. The Contractor shall not commence Work under this Contract until all insurance required hereunder has been obtained from an insurer authorized to do business in Virginia and such insurance has been approved by the Owner. The Contractor shall provide to the Owner Certificates of Insurance for all required coverage and, upon request, shall provide full copies of the Contractor's insurance policies. Approval of insurance by the Owner shall not relieve or decrease the liability of the Contractor hereunder.
- b. The Contractor shall procure and maintain, as required herein, the following insurance coverages:
  - 1. Workers' Compensation and Employer's Liability Insurance to cover all employees engaged in the Work of a type and in an amount to meet all Commonwealth of Virginia statutory requirements and regulations to provide all benefits to which employees may be entitled, including Employers Liability, with limits no less than \$1,000,000 bodily injury by accident or disease, each employee. Where applicable, coverage shall be extended to cover any claims under the United States Longshoreman's Act and Harbor Workers Act and Jones Act as may be appropriate for the work.
  - 2. Comprehensive General Liability insurance, including coverage for Broad Form Contractual, Premises/Operations, Product and Completed Operations, Independent Contractor's Liability, and Personal Injury Liability, with limits of at least \$2,000,000 per occurrence and \$2,000,000 aggregate, applicable on a per-project basis. The policy shall not exclude or limit the amount of coverage for the Work of the Project or for explosion, collapse, underground operations, mold, or exterior insulation and finish system ("EIFS").
  - 3. Automobile Liability Insurance with a limit of not less than \$1 million combined single limit for bodily injury and property damage per occurrence, covering all owned, non-owned, hired and borrowed vehicles, whether on-Site or off-Site.
  - 4. Contractor or the Asbestos Subcontractor shall provide occurrence-based liability insurance with asbestos coverages in an amount not less than \$1,000,000. The following shall be named as additional insureds on this policy: the Commonwealth of Virginia, its officers, employees and agents; the A/E (if not the Asbestos Project Designer); and the Contractor (where the asbestos work is being performed by the Asbestos Subcontractor).
- c. Unless otherwise specified, Contractor shall ensure that all insurance required by Subsection (b) above contains the following provisions:
  - 1. With the exception of Workers' Compensation insurance, the Commonwealth of Virginia, the Owner, and their officers, employees and agents shall be named as additional insureds on all policies. The additional insureds as stated for the asbestos coverage shall be as stated in Section 11(b)(4).
  - 2. All insurance coverage shall be considered primary and non-contributory with respect to

other insurance that might be available to the Contractor, A/E, Owner, or Agency.

3. All insurers shall waive rights of subrogation against the Commonwealth of Virginia, Owner and Agency for any claims covered by the insurance required herein.
4. All deductibles or self-insured retentions shall be the sole responsibility of the Contractor.
- d. No insurance will be canceled, dropped, replaced, or materially changed without at least thirty (30) Days' prior written Notice to and consent of the Owner.
- e. Contractor shall require each Subcontractor to carry the same insurance, and in the same amounts, required by Section 11(b)(1)-(3) above. The Contractor shall not allow any Subcontractor to commence Work on the Project until all insurance required of the Subcontractor by this Contract has been obtained by the Subcontractor and approved by the Contractor.
- f. Prior to award of the Contract, the Contractor shall submit, on the form provided by the Owner, a Certificate of Coverage verifying Workers' Compensation insurance is in place. The Contractor shall likewise obtain a Certificate of Coverage for Workers' Compensation insurance from each Subcontractor and shall provide a copy to the Owner prior to the Subcontractor beginning Work at the Project.

**12. "ALL-RISK" BUILDER'S RISK INSURANCE TO INCLUDE AN INSTALLATION FLOATER**

- a. The Contractor shall procure and maintain, at its cost, "all-risk" Builder's Risk insurance with minimum coverage and limits as follows:
  1. **New Construction, Addition, or Major Renovation:** When the Work is new construction, addition, or Major Renovation, the Contractor shall maintain "all-risk" Builder's Risk insurance for the Work and the entire structure or structures, if any, on which the Work is to be done with a minimum limit of not less than the insurable value of the structure(s) plus one hundred percent (100%) of the Contract Price and the value of all Change Orders, to represent the total value of the structure(s) and the Work on a replacement cost basis.
  2. **Limited Renovation:** When the Work is Limited Renovation to an existing structure, the Contractor shall maintain "all risk" Builder's Risk insurance in an amount equal to one hundred percent (100%) of the Contract Price and the value of all Change Orders, to represent the total value of the Work on a replacement cost basis.

When a project is an addition with Limited Renovation to an existing structure, then the insurable value of the existing structure shall not be included.

- b. Builder's risk insurance shall be provided on an "all risk" or equivalent policy form and shall include, without limitation, insurance against all perils. The insurance shall cover the costs of debris removal, temporary buildings, legal requirements, and compensation for A/E services and Contractor services required following an insured loss. The insurance shall cover portions of the Work stored off-Site, Work in transit, and all materials, supplies, equipment, machinery, and fixtures that are or will be part of the Project. The policy shall include coverage for mold resulting from a covered peril, property in transit or temporary storage, equipment breakdown/course of construction, and soft costs within the aggregate or blanket limit of the of the policy. If not otherwise covered by the Builder's Risk policy, Contractor also shall provide an installation floater to cover all equipment and materials intended for installation at the Project.

In the event the policy includes any coverages where the limit is less than the aggregate or blanket limit of the policy (sub limits), the coverage shall be no less than the stated minimum sub-limits for the following perils:

- Flood	\$2,000,000
- Earth Movement	\$2,000,000
- Debris Removal	\$2,000,000
- Extra or Expediting Expense	\$250,000
- Interior Water Damage	\$2,000,000
- Loss of Income/Extra Expense	12 Months
- Soft Costs	Blanket or Aggregate Limit/14 Day Waiting Period

The Certificate of Insurance provided to the Owner shall disclose all sub-limits, stating the peril and limit applying to each. In the event that the aggregate policy limit is less than the sub-limits identified above, coverage for all perils must be provided within the aggregate or blanket limit of the policy.

- c. Builder's risk insurance may include a deductible provision if the Owner so provides in the Supplemental General Conditions, in which case the Contractor will be liable for such deductible whenever a claim arises. Any loss payable under the Builder's Risk insurance shall be payable to the Owner, in accordance with its interests, as they may appear, and then to any other persons insured thereunder.

Written evidence of this insurance and a copy of the policy shall be provided to the Owner no later than thirty (30) Days following the award of the Contract. The policy shall not be canceled, dropped, replaced, or materially changed without at least thirty (30) Days' prior written Notice to and consent of the Owner.

- d. Builder's risk insurance shall include the interest of the Contractor, the Owner, the Commonwealth, and all Subcontractors and Sub-subcontractors. Contractor shall maintain the builder's risk insurance until Final Payment by the Owner or until no person other than the Owner has an insurable interest in the Work, whichever is later.
- e. Any insurance provided through the Department of Treasury, Division of Risk Management, on buildings, construction, additions or renovations will not extend to Contractor's nor Subcontractors' buildings, equipment, materials, tools or supplies unless these items are to become property of the Owner upon completion of the Project and the Owner has assumed responsibility for such items at the time of the loss.

### 13. TAXES, FEES AND ASSESSMENTS

The Contractor shall, without additional expense to the Owner, pay all applicable federal, state, and local taxes, fees, and assessments arising out of the Work, except the taxes, fees and assessments on the real property comprising the Site. If the State Building Official elects to have the local building official inspect the Work as provided by *Code of Virginia* § 36-98.1, the Owner shall pay the resulting fees to the local building official.

**14. PATENTS**

The Contractor shall obtain all licenses necessary to use any invention, article, appliance, process or technique of whatever kind and shall pay all royalties and license fees. The Contractor shall indemnify and hold harmless the Owner, its officers, agents and employees, against any loss or liability for or on account of the infringement of any patent rights in connection with any invention, process, technique, article or appliance manufactured or used in the performance of the Contract, including its use by the Owner, unless such invention, process, technique, article or appliance is specifically named in the Specifications or Plans as acceptable for use in carrying out the Work. If, before using any invention, process, technique, article or appliance specifically named in the Specifications or Plans as acceptable for use in carrying out the Work, the Contractor has or acquires information that the same is covered by letters of patent making it necessary to secure the permission of the patentee, or other, for the use of the same, the Contractor shall promptly advise the Owner and the A/E. The Owner may direct that some other invention, process, technique, article or appliance be used. Should the Contractor have reason to believe that the invention, process, technique, article or appliance so specified is an infringement of a patent, and fails to inform the Owner and the A/E, the Contractor shall be responsible for any loss or liability due to the infringement.

**15. ARCHITECT/ENGINEER'S STATUS**

- a. The A/E shall have authority to endeavor to secure the faithful performance of the Work by Contractor. The A/E shall review the Contractor's Submittals for conformance to the requirements of the Contract Documents and return copies to the Contractor with appropriate notations. The A/E shall interpret the requirements of the Plans and Specifications and issue Field Orders to the Contractor as may be required. The A/E shall recommend to the Owner suspension of the Work (in whole or in part) whenever such suspension may be necessary to ensure the proper execution of the Work or the requirements of the Contract. The A/E shall have authority to reject, in writing, Work, including material, installation or workmanship, which does not conform to the Contract Documents or is Defective. The A/E shall determine the progress and quality of the Work, subject to the right of the Owner to make an overriding decision to the contrary. Upon request by the Contractor, the A/E shall confirm, in writing within fourteen (14) Days, any verbal order or determination made by the A/E.
- b. The A/E shall have no authority to approve or order changes in the Work which alter the design concept or which call for an extension of the Contract Completion Date or Final Completion or a change in the Contract Price.
- c. The Owner shall have the right, but not the duty, to countermand any decision of the A/E and to follow or reject the advice of the A/E, including but not limited to acceptance of the Work, as it deems best in its sole discretion. In those instances where the A/E has been given authority to act, the A/E shall promptly do so, but in the case of disagreement between the A/E and the Owner, the decision of the Owner shall be final. The Contractor shall not be bound by any determination, interpretation or decision of the A/E contrary to the A/E's authority or that is not consistent with the Contract Documents. The party taking issue with the determination, interpretation or decision of the A/E shall give the other party written notice of such fact within fourteen (14) days after the determination, interpretation or decision is communicated by the A/E. In the actual performance of the Work, the Contractor shall proceed in accordance with instructions given by the A/E unless the Owner and the Contractor mutually agree in writing or by Change Order that the Contractor shall proceed otherwise.
- d. All orders from the Owner to the Contractor shall either be transmitted through the A/E or communicated directly to the Contractor and the A/E by the Owner.
- e. Should the Owner choose to employ another or different A/E, the status of the A/E so employed shall be the same as that of the former A/E.
- f. The A/E shall provide a progress report to the Owner and the Contractor after each A/E visit to the

Site. The report shall be in writing indicating the date, time of day, weather conditions and the names of the persons representing the A/E who participated in the visit. The report shall advise the Owner of any problems that were noted or observed and shall compare the A/E's observations of the actual progress of the Work with that reported by the Contractor. On the basis of its on-Site observations, the A/E will make every reasonable effort to guard the Owner against delays, defects, and deficiencies in the Work of the Contractor. The A/E shall have the authority to inspect the Work, to note and report Defective Work and deviations from the Contract Documents to the Owner, to reject Work, and to recommend to the Owner the suspension of the Work when necessary to prevent Defective Work from proceeding or being covered.

- g. The A/E shall not be responsible for construction means, methods, techniques, sequences or procedures (other than those expressly specified in the Contract Documents), or for safety precautions and programs in connection with the Work. The A/E shall not be responsible for the Contractor's failure to carry out the Contractor's own responsibilities.
- h. The A/E generally conveys written decisions and Notices to the Contractor through the Project Manager and shall generally receive information and Notices from the Contractor through the Project Manager unless otherwise agreed. The Owner may delegate from the A/E to the Project Manager certain inspection, verification, acceptance, rejection, and administrative duties and authority, but any such delegation shall be in writing and a copy thereof provided to the Contractor.
- i. The provisions of this Section are included as information only to describe the relationship between the Owner, A/E, and Contractor. No failure of the A/E to act in accordance with this Section shall relieve the Contractor from its obligations under the Contract or create any rights in favor of the Contractor against the Owner.

## 16. INSPECTION

- a. All material and workmanship shall be subject to inspection, examination and testing by the Owner, the A/E, the Project Inspector, authorized inspectors and authorized independent testing entities at any and all times during manufacture and/or construction. The A/E and the Owner shall have authority to reject Defective Work and non-conforming material and require its correction. Rejected workmanship shall be satisfactorily corrected and rejected material shall be satisfactorily replaced with proper material without charge therefore, and the Contractor shall promptly segregate and remove the rejected material from the Site. If the Contractor fails to proceed at once with replacement of rejected material and/or the correction of Defective Work, the Owner may replace such material and/or correct such Work and charge the cost to the Contractor, or may terminate the Contract as provided in Section 41 of these General Conditions, the Contractor and surety being liable for any damage to the same extent as provided in Section 41 for termination thereunder.
- b. Site inspections, tests conducted on Site and tests of materials gathered on Site which the Contract requires to be performed by independent testing entities shall be contracted and paid for by the Owner. Examples of such tests are the testing of cast-in-place concrete, foundation materials, soil compaction, pile installations, caisson bearings and steel framing connections. The Contractor shall promptly furnish, without additional charge, all reasonable facilities, labor and materials necessary and convenient for making such tests. Except as provided in (d) below, whenever such examination and testing finds Defective Work or non-conforming materials or equipment, the Contractor shall reimburse the Owner for the cost of reexamination and retesting. Although conducted by independent testing entities, the Owner will not contract and pay for tests or certifications of materials, manufactured products or assemblies which the Contract, codes, standards, etc., require to be tested and/or certified for compliance with industry standards such as Underwriters Laboratories, Factory Mutual or ASTM. If fees are charged for such tests and certifications, they shall be paid by the Contractor. The Contractor shall also pay for all inspections, tests, and certifications which the Contract specifically requires the Contractor to

perform or to pay, together with any inspections and tests which it chooses to perform for its own purposes, but which are not required by the Contract.

- c. Where Work is related to or dependent on Defective Work, the Contractor shall stop such related or dependent Work until the Defective Work is corrected or an alternative solution is presented that is satisfactory to the Owner. Where Work is rejected as Defective, the Contractor shall stop like Work in other areas or locations on the Project until the Owner has approved corrective measures.
- d. Should it be considered necessary or advisable by the Owner or the A/E at any time before the Final Completion Date to make an examination of any part of the Work already completed, by removing or tearing out portions of the Work, the Contractor shall promptly furnish all necessary facilities, labor and material to expose the Work to be tested to the extent required. If such Work is found to be Defective in any respect, the Contractor shall bear all the expenses of uncovering the Work, of examination and testing, and of satisfactory reconstruction and correction of the Defective Work. If, however, such Work is found to meet the requirements of the Contract, the actual cost of the Contractor's labor and material necessarily involved in uncovering the Work, the cost of examination and testing, and Contractor's cost of material and labor necessary for replacement of the examined Work including a markup of fifteen (15%) percent for overhead and profit, shall be paid to the Contractor and, if the Contract Completion Date was delayed thereby, a time extension equivalent to the impact on the Critical Path shall be issued by Change Order. Notwithstanding the foregoing, the Contractor shall be responsible for all costs and expenses in removing and replacing the Work if the Contractor had covered the Work prior to any inspection or test required by the Contract Documents or contrary to the instructions of the A/E, Owner, Project Inspector, or Building Official.

The Project Inspector has the authority to recommend to the A/E and the Owner that the Work be suspended when in his or her judgment the Contract Documents are not being followed. Any such suspension shall be continued only until the matter in question is resolved to the satisfaction of the Owner. The cost of any such Work stoppage shall be borne by the Contractor unless it is later determined that the Work in question was in full compliance with the Contract Documents.

- e. The Project Inspector has the right and the authority to:
  - 1. Inspect all construction materials, equipment, and supplies for quality and for compliance with the Contract Documents and/or approved shop drawings and Submittals.
  - 2. Inspect workmanship for compliance with the standards described in the Contract Documents.
  - 3. Observe and report on all tests and inspections performed by the Contractor.
  - 4. Recommend rejection of Work which does not conform to requirements of the Contract Documents or is Defective.
  - 5. Keep a record of construction activities, tests, inspections, and reports.
  - 6. Attend all Site construction meetings and inspections held by the Owner and/or the A/E with the Contractor.
  - 7. Check materials and equipment, together with documentation related thereto, delivered for conformance with approved Submittals and the Contract.
  - 8. Check installations for proper workmanship and conformance with shop drawings and installation instructions.

9. Assist in the review and verification of the Form CO-12, Schedule of Values and Certificate for Payment, submitted by the Contractor each month.
  10. Do all things for or on behalf of the Owner as the Owner may direct in writing.
- f. The Project Inspector has no authority to:
1. Authorize deviations from the Contract Documents;
  2. Enter into the area of responsibility of the Contractor's superintendent;
  3. Issue directions relative to any aspect of construction means, methods, techniques, sequences or procedures unless specifically required by the Contract Documents or in regard to safety precautions and programs in connection with the Work;
  4. Authorize or suggest that the Owner occupy the Project, in whole or in part; or
  5. Issue a certificate for payment.
- g. The duties of the Project Inspector are for the benefit of the Owner only and not for the Contractor. The Contractor may not rely upon any act, statement, or failure to act on the part of the Project Inspector, nor shall the failure of the Project Inspector to properly perform his or her duties in any way excuse Defective Work, improper performance of the Work, or noncompliance with the Contract Documents by the Contractor.

**17. SUPERINTENDENCE BY CONTRACTOR**

- a. The Contractor shall have a competent foreman or superintendent, satisfactory to the A/E and the Owner, on the Site at all times during the performance of the Work. The superintendent shall be familiar with and be able to read and understand the Contract Documents and be capable of communicating verbally and in writing with the Owner's representatives, the A/E, and the Contractor's workers. The Contractor shall be responsible for all construction means, methods, techniques, sequences and procedures, for coordinating all portions of the Work except where otherwise specified in the Contract Documents, and for all safety and worker health programs and practices. The Contractor shall notify the Owner, in writing, of any proposed change in foreman or superintendent, including the reason therefore, prior to making such change.
- b. The Contractor shall, at all times, enforce strict discipline and good order among the workers on the Project, and shall not employ on the Work, or contract with, any unfit person, anyone not skilled in the Work assigned to him or her, or anyone who will not work in harmony with those employed by the Contractor, the Subcontractors, the Owner or the Owner's separate contractors and their subcontractors or anyone who will not interact appropriately with the public.
- c. The Owner may, in writing, require the Contractor to remove from the Site any employee or Subcontractor's employee the Owner deems to be incompetent, careless, not working in harmony with others on the Site, not interacting appropriately with the public, or otherwise objectionable, but the Owner shall have no obligation to do so.

**18. CONSTRUCTION SUPERVISION, METHODS AND PROCEDURES**

- a. The Contractor shall be solely responsible for supervising and directing the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract. The Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction and for coordinating all portions of the Work, except where otherwise specified in the Contract Documents. The Contractor shall not be responsible for the negligence of others in the design or



selection of a specific means, method, technique, sequence or procedure of construction expressly required by the Contract. The Contractor is solely responsible to the Owner that the finished Work complies with the Contract Documents.

The Contractor shall be solely responsible for health and safety precautions and programs for workers and others in connection with the Work. No inspection by, knowledge on the part of, or acquiescence by the A/E, the Project Inspector, the Owner, the Owner's employees and agents, or any other Person shall relieve the Contractor from its sole responsibility for compliance with the requirements of the Contract and its sole responsibility for health and safety programs and precautions for the Work.

- b. If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, the Contractor may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to the A/E, subject to the Owner's right to disapprove. The Contractor must submit its written request for the substitution to the A/E with sufficient information to allow the A/E to determine that the substitute proposed is equivalent to that indicated or required by the Contract.
- c. The Plans and Specifications are divided into several parts, or sections, for convenience only and because the entirety of the Plans and Specifications must be considered and construed as a whole. The divisions of the Plans and Specifications are not intended to control the Contractor in dividing the Work among Subcontractors or to limit the Work performed by any trade. The Contractor shall be solely responsible for the coordination of the trades, Subcontractors and vendors engaged in the Work and for the compensation of the trades, Subcontractors and vendors for the Work performed.

## 19. SCHEDULE OF THE WORK

- a. **General:** The Contractor is responsible for the scheduling and sequencing of the Work, for coordinating the Work, for monitoring the progress of the Work, and for taking appropriate action to keep the Work on schedule to finish on or before the Contract Completion Date. The Contractor may attempt to achieve Substantial Completion before the Contract Completion Date and receive payment in accordance with Section 36 for the Work completed each period. However, the Contract Completion Date shall be used in all schedules and schedule updates as the deadline for which Substantial Completion is to be achieved. The time (in Days) between the Contractor's planned early completion and the Contract Completion Date is part of the Float. Extensions of time allowed pursuant to Sections 38, 39, and 43, the determination of any compensation for compensable delay, and all other matters between the Owner and the Contractor will be determined using the Contract Completion Date, not an earlier Substantial Completion date planned by the Contractor.

Within two (2) weeks after the Contractor signs the Contract, unless otherwise extended by the Owner at the time of the signing, the Contractor shall prepare and submit to the Owner, with a copy to the A/E, a schedule for achieving Substantial Completion by the Contract Completion Date. The preliminary schedule shall be in sufficient detail to show the sequencing of the various trades for each floor level, wing or work area. The Owner will notify the Contractor of any comments on the preliminary schedule within fifteen (15) Days of receipt by the Owner.

A fully complete Project schedule meeting the requirements set forth below in subparagraph (1) or (2), as applicable, must be submitted no later than sixty (60) Days after the Contract is signed by the Owner.

- 1. For Contracts with a Contract Price less than \$1,500,000, a "critical path method" or bar graph schedule may be utilized. The schedule shall indicate the estimated starting and completion dates for each major element of the work and satisfy the requirements of Section 19 (b) below.

2. For Contracts with a Contract Price of \$1,500,000 or more, a “critical path method” schedule shall be utilized to control the planning and scheduling of the Work. The “critical path method” schedule shall be the responsibility of the Contractor and shall be paid for by the Contractor and shall satisfy the requirements of Section 19(c) below.

It is the Contractor’s responsibility to submit a schedule that shows Substantial Completion of the Work by the Contract Completion Date and completion of any portions of the Work by any interim deadlines established by the Contract.

The Contractor shall allow sufficient time in the schedule for the A/E to conduct all reviews and inspections required under the A/E Contract with the Owner. If the A/E and the Contractor are unable to agree as to what constitutes sufficient time, the Owner shall determine the appropriate duration for such A/E activities.

The Owner and A/E review schedules and schedule-related submittals solely for compliance with the requirements of this Section. The Owner’s failure to reject or its acceptance of any schedule, graph, chart, recovery schedule, updated schedule, plan of action, monthly status report, or similar schedule-related submittals, shall not constitute a representation, admission, or warranty by the Owner, including but not limited to a representation, admission, or warranty that the schedule is feasible or practical or that contents therein are true or accurate, nor shall any such acceptance or failure to reject relieve the Contractor from sole responsibility for completing the Work by the Contract Completion Date.

No progress payments will be payable to the Contractor until after it has submitted a preliminary schedule which is acceptable to the Owner. Neither the second progress payment nor any subsequent payment shall be payable to the Contractor until it has submitted a fully complete Project schedule accepted by the Owner. No subsequent progress payments will be payable to the Contractor unless it submits each monthly Project report required by Section 19(d) in a form accepted by Owner and each recovery schedule required by Owner pursuant to Section 19(e).

Failure to provide a satisfactory preliminary schedule, fully complete Project schedule, or monthly Project report within the time limits stated above shall be a material breach for which the Owner may terminate the Contract in the manner provided in Section 41 of these General Conditions.

- b. **Bar Graph Schedule:** Where a bar graph schedule is allowed, it shall be time-scaled in weekly increments, shall indicate the estimated starting and completion dates for each major element of the Work by trade and by area, level, or zone, and shall schedule dates for all salient features and activities, including but not limited to the placing of orders for materials, submission of Shop Drawings and other Submittals for review, approval of Shop Drawings and Submittals by A/E, the manufacture and delivery of material, the testing and the installation of materials, supplies and equipment, and all Work activities to be performed by the Contractor. Each Work activity will be assigned a duration by the Contractor. One Day shall be the time unit used. The bar graph shall establish and show the Critical Path for the Work.
- c. **Critical Path Method Schedule:** Where a Critical Path method schedule is required, it shall be in the time-scaled precedence format using the Contractor’s logic and time estimates. The Critical Path method schedule shall be drawn or plotted with activities grouped or zoned by Work area or Subcontract rather than random (or scattered) format.

The Critical Path method schedule shall be time-scaled on a weekly basis and shall be drawn or plotted at a level of detail and logic which will schedule all salient features and activities of the Work, including not only the actual construction Work for each trade, but also the submission of Shop Drawings and Submittals for review, approval of Shop Drawings and Submittals by the A/E, placing of orders for materials, the manufacture and delivery of materials, the testing and installation of materials and equipment, and all Work activities to be performed by the Contractor.

The Critical Path method schedule shall have no line-item activities longer than thirty (30) Days in duration, and activities shall be included to provide sufficient detail for effectively managing the sequence of the Work. 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 the Time for Completion and by the Contract Completion Date and any interim deadlines established by the Contract. Each Work activity will be assigned a duration by the Contractor.

When completed, the Critical Path method schedule shall be submitted to the A/E and the Owner for review. The Critical Path method schedule will identify and describe each activity, state the duration of each activity, the calendar dates for the early and late start and the early and late finish of each activity, any constraints placed upon the activity, and clearly depict all activities on the Critical Path for the Work. Float and Free Float shall be indicated for all activities. Float, whether Free Float or Total Float, shall not be considered for the exclusive use or benefit of either the Owner or the Contractor, but must be allocated in the best interest of completing the Work by the Contract Completion Date.

On contracts with a price over \$5,000,000, each activity on the Critical Path method schedule shall also be attributable to, and correlate with, each activity on the Schedule of Values, the sum of which for all activities shall equal the Contract Price.

When accepted by the Owner and the A/E as compliant with the requirements of this Section, the schedule shall become the baseline Critical Path method schedule for the Project. Acceptance of the schedule by the Owner does not indicate agreement with, nor responsibility for, the proposed or actual duration of any activity or logic shown on the accepted schedule.

- d. **Monthly Project Reports:** The Contractor shall review progress of the Work not less than each month, but as often as necessary to properly manage the Project and stay on schedule to finish before the Contract Completion Date. The Contractor shall collect and preserve information on Change Orders, including extensions of time. The Contractor shall evaluate this information and update the latest accepted schedule as often as necessary to finish before the Contract Completion Date. The Contractor shall submit to the A/E along with each Certificate for Payment a copy of the bar graph schedule annotated to show the current progress or, for projects requiring a Critical Path method schedule, a monthly report of the status of all activities. The bar graph schedule or monthly status report submitted with each Certificate for Payment shall show the Work completed to date in comparison with the Work scheduled for completion, including but not limited to the dates for the beginning and completion of the placing of orders and the manufacture, testing and installation of materials, supplies and equipment. The form for these reports shall be approved by the A/E and the Owner prior to submission of the first Certificate for Payment. If any elements of the Work are behind schedule, regardless of whether they may prevent the Work from being completed on time, the Contractor must indicate in writing in the report what measures it is taking and plans to take to bring each such element back on schedule and to ensure that the Work is completed before the Contract Completion Date.
- e. **Progress Delay:** Should any of the following conditions exist, the Owner may require that the Contractor prepare, at no extra cost to the Owner, a plan of action and a recovery schedule for completing the Work by the Contract Completion Date:
1. The Contractor's monthly project report indicates delays that, in the judgment of the A/E or the Owner, call into question the Contractor's ability to complete the Work by the Contract Completion Date;
  2. The Critical Path method schedule sorted by early finish dates shows the Contractor to be thirty (30) or more Days behind on the Critical Path schedule at any time during the Work, up to thirty (30) Days prior to the Contract Completion Date;
  3. The Contractor desires to make changes in the logic or sequencing of Work activities or

the planned duration of future activities of the Critical Path method schedule which, in the judgment of the A/E or the Owner, are of a significant departure from those of the baseline schedule or prior schedule updates.

The plan of action and recovery schedule, when required, shall contain a narrative explanation and display how the Contractor intends to regain compliance with the most current and Owner accepted Critical Path method schedule, as updated with approved Change Orders, if any.

The plan of action shall be submitted to the Owner for review within two (2) business days of the Contractor receiving the Owner's written request. The recovery schedule, when required, shall be submitted to the Owner within five (5) Days of the Contractor's receiving the Owner's written request.

- f. **Early Completion of Project:** The Contractor may attempt to achieve Substantial Completion before the Contract Completion Date. However, such planned early completion shall be for the Contractor's convenience only and shall not create any additional rights of the Contractor or obligations of the Owner under this Contract, nor shall it change the Time for Completion or the Contract Completion Date. The Contractor shall not be required to pay damages to the Owner because of the Contractor's failure to achieve Substantial Completion by any planned earlier date. Likewise, the Owner shall not pay the Contractor any additional compensation for achieving Substantial Completion prior to the Contract Completion Date nor will the Owner owe the Contractor any compensation should the Owner, its officers, employees, or agents cause the Contractor not to achieve Substantial Completion earlier than the Contract Completion Date.

Contractor may request or propose to change the Contract Completion Date to reflect an earlier Substantial Completion date. The Owner may, but is not required to, accept such proposal. However, a change in the Time for Completion or the Contract Completion Date shall be accomplished only by Change Order. If the Contractor's proposal to change the Time for Completion or the Contract Completion Date is accepted, a Change Order will be issued stating that all references in the Contract, including these General Conditions, to the Time for Completion or the Contract Completion Date shall thereafter refer to the date as modified, and all rights and obligations, including the Contractor's liability for actual damages, delay damages and/or liquidated damages, shall be determined in relation to the date, as modified.

## 20. SCHEDULE OF VALUES AND CERTIFICATE FOR PAYMENT

- a. Before submittal of the first Certificate for Payment, the Contractor shall prepare for review and approval of the A/E and the Owner the Schedule of Values listed by trades or by Specifications sections for the Work, the total for which equals the Contract Price. Where the Work has multiple parts or phases, the Contractor shall prepare appropriate Schedules of Values to facilitate reviews of Certificate for Payment submitted for each part or phase.

All Certificates for Payment shall be made in the ASTM Unifomat II structure on the Form CO-12, Schedule of Values and Certificate for Payment.

- b. If the Contractor requests, or intends to request, payment for materials stored in an approved and secure manner, the Schedule of Values must indicate the amount for labor and the amount for materials, and in a supplement thereto must include an itemized list of materials for that trade or Work section. The material breakdown shall be in sufficient detail to allow verification of the quantities required for the Project, the quantities delivered, the Work completed, and the quantities stored on or off-Site.
- c. The Contractor shall complete the "Value of Work Completed" portion of the Form CO-12, complete and sign the Contractor's certification, and attach all substantiating material each Certificate for Payment. Such substantiating material includes, but is not limited to, invoices for materials, delivery tickets, timesheets, payroll records, daily job logs/records, and similar materials

which, in the opinion of the Owner and the A/E, are necessary or sufficient to justify payment of the amount requested.

- d. The labor progress for any task or activity shall be calculated based upon the percentage of Work complete up to fifty percent (50%) of the completion of the task or activity. Thereafter, the evaluation of labor progress will be based upon the effort required to complete that task or activity. The material progress shall be calculated as the invoiced dollar cost of materials used in relation to the amount estimated as necessary to complete a particular element of Work. When calculating material progress, credit shall be given for installed material as well as that stored on the Site and any material stored off-Site which has been certified by the A/E in accordance with Section 36 of these General Conditions.
- e. Should Work included in previous Certificates for Payment, and for which payment has been made, subsequently be identified by tests, inspection, or other means, as Defective or not acceptable or not conforming to the Contract Documents, the "Value of Work Completed" portion of the first Certificate for Payment submitted after such identification shall be modified to reduce the "completed" value of that Work to a percentage reflecting only that work which is not Defective or nonconforming.

## **21. ACCESS TO WORK**

The A/E, the Owner, the Project Manager, the Owner's inspectors and other testing personnel, the Building Official, inspectors from the Department of Labor and Industry, and others authorized by the Owner, shall have access to the Work at all times. The Contractor shall provide proper facilities for access and inspection.

## **22. SURVEYS AND LAYOUT**

- a. The Owner shall furnish the Contractor documents showing property lines and the location of existing buildings and improvements at the Site. The Contractor shall provide competent surveying and engineering services to execute the Work and shall be responsible for the accuracy of those surveying and engineering services.
- b. The Owner shall provide the general reference points and benchmarks on the Site as required of it by the Plans and Specifications. If the Contractor finds that any previously established reference points have been lost or destroyed, it shall promptly notify the A/E.
- c. The Contractor shall protect and preserve the established benchmarks and monuments and shall make no changes in locations without prior written Notice to the A/E and prior written approval from the Owner. Benchmarks and monuments that are lost or destroyed or which require shifting because of necessary changes in grades or locations shall, subject to prior written approval of the Owner, be replaced and accurately located by the Contractor.

## **23. PLANS AND SPECIFICATIONS**

- a. The general character and scope of the Work are illustrated and described by the Plans and the Specifications. If the Contractor deems additional detail or information to be needed, the Contractor shall request the same in writing from the A/E. The request shall precisely state the detail or information needed and shall explain why it is needed. The Contractor shall also indicate a date by which the requested information is required. The A/E shall provide by Field Order such further detail and information as is necessary by the date required so long as the date indicated is reasonable. Any additional drawings and instructions supplied to the Contractor shall be consistent with the Contract Documents, shall be true developments thereof, and shall be so prepared that they can be reasonably interpreted as a part thereof. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions at no additional cost to the Owner and with no time extension.

- b. If the Contractor finds a conflict, error, omission, or other discrepancy in the Plans or Specifications, he shall notify the A/E in writing as soon as possible, but before proceeding with any Work that is or may be impacted by the matter. The A/E shall issue a clarification by Field Order to the Contractor stating the correct requirements. If the Contractor deems the Field Order requires additional or extra Work, it shall provide Notice of its request for additional time and/or compensation to the Owner and A/E prior to proceeding with that Work. The Contractor also shall submit a request for Change Order along with a detailed substantiating cost proposal through the A/E to the Owner within fourteen (14) Days of the receipt of the Field Order or before proceeding with the Work, whichever is earlier.
- c. If a conflict, error, omission or other discrepancy in Plans or Specifications was reasonably apparent or with reasonable diligence should have been apparent to the Contractor prior to submitting its bid or Proposal, and the Contractor failed to submit a question to the A/E in the time and manner required by the Instructions to Bidders, then the Contractor shall not be entitled to additional compensation or time or entitled to bring a claim against the Owner based on such conflict, error, omission or other discrepancy. If the Contractor performs any Work, or is delayed in performing any Work, where such Work involves a conflict, error, omission, or other discrepancy in the Plans or Specifications that the Contractor knew about, or with reasonable diligence should have known about, for which the Contractor failed to provide Notice to the A/E and Owner as required, the Contractor shall assume full responsibility for the Work or delay and shall bear all costs attributable to correcting any Work requiring correction or to any delay, and such conflict, error, omission, or other discrepancy shall not be the basis for a claim against or any recovery from the Owner.
- d. In case of differences between a small and large scale Drawing, the large scale Drawing shall govern. Where on a Drawing a portion of the Work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to all other like portions of the Work.
- e. Where the word “similar” appears on a Drawing, it shall be interpreted in its general sense and not as meaning “identical,” and all details shall be worked out in relation to their location and their connection with other parts of the Work.
- f. Measurements or dimensions shown on the Drawing for Site features, utilities, buildings, structures, or improvements shall be verified at the Site by the Contractor before commencing the Work. The Contractor shall not scale measurements or dimensions from a Drawing. If there are discrepancies among Drawings or the Plans, the Contractor shall notify and request clarification from the A/E before proceeding with the impacted Work. If new Work is to connect to, match with or be provided in existing facilities, buildings, or improvements, the Contractor shall verify the actual existing conditions and necessary dimensions prior to ordering or fabrication of materials or construction.
- g. As-Built Drawings: The Contractor shall maintain at the Site for the Owner one copy of the As-Built Drawings in good order and marked to record all changes as they occur during construction. These shall be available to the A/E, the Owner, the Project Inspector, the Owner’s other inspectors and to the Owner’s testing personnel
- h. Preparation of Record Drawings: Upon completion of the Work and prior to the final inspection, the Contractor shall deliver to the A/E, for preparation of the Record Drawings, one complete set of “As Built” Drawings depicting the Work in its as-built condition at Final Completion.

#### **24. SUBMITTALS AND PROJECT RECORDS**

- a. The Contractor shall submit a listing of all Submittals required by the A/E or which the Contractor identifies as necessary, stating the dates for the submission of each Submittal. The listing shall be in a format acceptable to the A/E. The Contractor shall identify all Submittals with the Owner’s

Project Code Number as required by Section 24(e).

- b. Submittals shall be forwarded to the A/E for approval if required by the Specifications or if requested by the A/E or the Owner. No part of the Work dealt with by a Submittal shall be ordered, fabricated or installed by the Contractor, except at its own risk, until the Submittal for that Work has been approved.

Working drawings, Shop Drawings and/or Submittals for fire protection, fire alarm, fire detection and security systems shall be submitted to, and approved by, first the A/E and then the Building Official prior to ordering, fabricating or installing such systems. The Contractor shall be solely responsible for obtaining such approvals. No part of the Work involving such systems shall be ordered, fabricated or installed by the Contractor until such approvals have been obtained.

- c. The Contractor shall furnish to the A/E for approval, the name of the manufacturer, the model number, and other identifying data and information respecting the performance, capacity, nature and rating of the machinery and mechanical and other equipment which the Contractor contemplates incorporating in the Work. When Submittals are required by this Contract for materials, the Contractor shall furnish full information concerning the material or articles which the Contractor intends to incorporate in the Work. When required, samples shall be submitted for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material and articles installed or used without required approval shall be at the risk of subsequent rejection.
- d. Unless otherwise indicated or required by the Specifications, Shop Drawings shall be submitted in the form of one reproducible tracing and three blue-line or black-line prints. Catalog cuts, product data and other non-reproducible literature, except certificates, shall be submitted in six (6) copies minimum, of which three (3) will be retained by the A/E and the remainder will be returned to the Contractor. The Contractor shall maintain one copy of all approved Shop Drawings and Submittals in the construction trailer for use by inspectors. If agreed by the Owner, A/E, and Contractor, Submittals may be provided in electronic format in lieu of hardcopy format.
- e. Submittals shall be accompanied by a letter of transmittal which shall list the Project Code Number, the Submittals included, and the date. Submittals shall be complete in every respect and bound in sets. Each Submittal shall be clearly marked to show each item, component and/or optional feature proposed to be incorporated into the Work. Each Submittal shall contain specific references to the sections of the Plans and Specifications to which the item or component that is the subject of the Submittal relates.
- f. The Contractor shall check Submittals for compliance with the requirements of the Contract Documents. The Contractor shall clearly note in writing any and all items which deviate from the requirements of the Contract Documents. Reasons for deviation shall be included with the Submittal. The Contractor shall be solely responsible for checking all dimensions and coordinating all materials and trades to ensure that the components or products proposed, individually or in combination, will fit in the space available and that they will be compatible with other components or products provided.

- g. After checking each Submittal, the Contractor shall stamp each sheet of the Submittal with the Contractor's review stamp. Data submitted in a bound volume or on one sheet printed on two sides, may be stamped on the front of the first sheet only. The Contractor's review stamp shall be worded as follows:

The equipment and material shown and marked in this Submittal is proposed to be incorporated into this Project, is in compliance with the Contract Plans and Specifications unless otherwise shown in bold-face type or lettering and listed on a page or pages captioned "**DEPARTURES FROM PLANS AND SPECIFICATIONS**", and can be installed in the allocated spaces.

Reviewed by \_\_\_\_\_ Date \_\_\_\_\_

- The person signing the review stamp shall be the person designated in writing by the Contractor as having that authority. The identity of such individual shall be forwarded to the A/E prior to or with the first Submittal. The signature on the review stamp shall be handwritten in ink, or in the case of electronic submittals, electronically signed in accordance with *Code of Virginia* § 59.1-479 *et seq.* Stamped signatures are not acceptable.
- h. The Contractor shall forward all Submittals sufficiently in advance of construction activities and requirements to allow sufficient time for checking, correcting, resubmitting and rechecking each Submittal.
  - i. If a Submittal indicates a departure from the Contract Documents, the A/E may reject the Submittal or recommend it to the Owner, who shall approve or reject it as the Owner, in its sole discretion, sees fit. Any departure from the Contract Documents must be authorized by a Change Order if it results in adjustment of the Contract Price or the Contract Completion Date.
  - j. The A/E is responsible to the Owner, but not to the Contractor, to verify that the information, equipment and materials depicted in Submittals conform to the design concept and functional requirements of the Plans and Specifications, that the detailed design portrayed in Shop Drawings and proposed equipment and materials shown in Submittals are of the quality specified and will function properly, and that the Submittals comply with the Contract Documents.
  - k. The Work shall be in accordance with approved Submittals. Approval of the Contractor's Submittals by the A/E does not relieve the Contractor from responsibility for complying with the Contract Documents.
  - l. The Plans and/or Specifications may indicate that the A/E designed or detailed a portion of the Work-around a particular product. Should a different product be proposed by the Contractor and accepted, all modifications, rerouting, relocations and variations required for proper installation and coordination to comply with the design concept and requirements of the Contract Documents shall be the responsibility of the Contractor and shall be made at no extra cost to the Owner. If the plans were noted as designed or detailed around a particular product and/or if a product is named when a "brand name or equal" requirement has been used, other products may be utilized following Section 26 of these General Conditions.
  - m. Additional Submittal requirements are shown in the Specifications.
  - n. Ownership of all materials and documentation including Shop Drawings, BIM models, copies of any calculations and analyses prepared and other Project-specific details of building components created during the Submittal process shall belong exclusively to the Owner. These materials and documentation, whether completed or not, shall be the property of the Commonwealth of Virginia, whether the Work for which they are made is executed or not. The Contractor shall not use these materials on any other work or release any information about these materials without the express written consent of the Owner.



Such material may be subject to public inspection in accordance with the Virginia Freedom of Information Act. Trade secrets or proprietary information submitted by a bidder, offeror, or contractor in connection with a procurement transaction shall not be subject to disclosure under the Virginia Freedom of Information Act, provided the bidder, offeror, or contractor timely invoked the protections of *Code of Virginia* § 2.2-4342(F).

- o. The Contractor shall maintain comprehensive records of all documentation produced in the performance of the Work and maintain a records management system to provide for document tracking, organization, storage and archiving of such documentation. The Contractor's records management system shall provide for the electronic storage and transmission of Project documents and information through one or more of the following methods: (1) web accessible project management software; (2) electronic files shared utilizing removable electronic media; (3) paper copies of documentation; or (4) in such manner agreed to by the Owner and Contractor. Such records shall be retained by the Contractor for a period of five (5) years following the Final Completion Date. The Contractor shall make the project documentation available to the Owner within five (5) Days of request in an orderly, indexed manner to allow individual documents to be easily located and reviewed. The Contractor shall ensure all documentation is kept current and stored in the records management system in a timely manner.
- p. The Contractor's Project documentation shall include regular construction photographs to show progress of the Work and items that are or may be the subject of Contractor or Subcontractor claims. The photographer shall label each photograph with, at a minimum, the Project name, building name/number, City, State, name of Contractor/Subcontractor(s) whose work is depicted, date and time the photograph was taken, description of weather conditions, subject matter and viewpoint of the photograph, name of the photographer, and the names of any observers.

## 25. FEES, SERVICES AND FACILITIES

- a. The Contractor shall obtain all permits, except the Building Permit, and pay for all fees and charges necessary for temporary access, public right-of-way blockage or use, temporary connections to utilities, and the use of property (other than the Site) for storage of materials and other purposes, unless otherwise specifically stated in the Contract Documents.
- b. Certain projects such as renovations and interior modifications of existing buildings will usually have water and electric service to the building. In those instances, water and electric power, if required for the Work under the Contract, will be furnished by the Owner subject to reasonable use by the Contractor, but only to the extent and capacity of present services. The Contractor shall be responsible for providing required connections, temporary wiring, piping, etc. to these services in a safe manner and in accordance with applicable codes. All temporary wire, pipe, etc. shall be removed before the Substantial Completion inspection. Acceptance by the Contractor of the use of Owner's water and electricity constitutes a release to the Owner of all claims and of all liability to the Contractor for any damages which may result from the use of such utilities and power and water outages or voltage variations.
- c. The Owner shall pay any connection charges for permanent utility connections directly to the utility Supplier. The Contractor shall coordinate such connections with the utility Supplier.
- d. It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor, either directly or through its Subcontractors, shall provide and pay for all material, labor, tools, equipment, water, light, power, telephone and other services or facilities of every nature whatsoever necessary to execute completely and deliver the Work before the Contract Completion Date.
- e. The Contractor shall provide all required temporary facilities, including Contractor's office space,

Owner's Project Inspector's office space (if required by the Specifications), sanitary facilities, and storage space, as required for the operations and the protection of the materials and the Work. Number, sizes and locations shall be subject to approval of the Owner. Sanitary facilities shall be plumbed into an approved waste treatment system or shall be an approved type of chemical toilet and shall be regularly serviced.

- f. Use and occupancy of the construction site as the Owner's Project Inspector's office or as a work or meeting space for other than contractor employees prior to receipt of a Certificate of Use and Occupancy is prohibited.

**26. EQUALS**

- a. **Brand names:** Unless otherwise stated in the Specifications, the identification of a certain brand, make or manufacturer denotes the characteristics, quality, workmanship, economy of operation and suitability for the intended purpose of the article to be supplied, but does not restrict the Contractor to the specific brand, make, or manufacturer indicated. Rather, the information conveys to the Contractor the general style, type, character and quality of the article to be supplied.
- b. **Equal materials, equipment or assemblies:** Whenever in these Contract Documents a particular brand, make of material, device or equipment is shown or specified, such brand, make of material, device or equipment shall be regarded merely as a standard. Any other brand, make or manufacturer of a product, assembly or equipment which in the opinion of the A/E is the equal of that specified, considering quality, capabilities, workmanship, configuration, economy of operation, useful life, compatibility with design of the Work, and suitability for the intended purpose, will be accepted unless rejected by the Owner as not being equal.
- c. **Substitute materials, equipment or assemblies:** The Contractor may propose to substitute a material, product, equipment, or assembly which deviates from the requirements of the Contract Documents but which the Contractor deems will perform the same function and have equal capabilities, service life, economy of operations, and suitability for the intended purpose. The proposal must include any cost differentials proposed. The Owner will have the A/E provide an initial evaluation of such proposed substitutes and provide a recommendation on acceptability and indicate the A/E's redesign fee to incorporate the substitution into the Contract Documents. The Owner shall have the right to limit or reject substitutions at its sole discretion.
- d. The Contractor shall be responsible for making all changes in the Work necessary to adapt and accommodate any equal or substitute product approved for use by Owner. The necessary changes shall be made at the Contractor's expense.

**27. AVAILABILITY OF MATERIALS**

If a brand name, material, product, or model number included in the Contract Documents is not available on the present market, alternate equal materials, products or model numbers may be proposed by the Contractor through the A/E for approval by the Owner through the process set forth in Section 26.

**28. CONTRACTOR'S TITLE TO MATERIALS**

No materials or supplies for the Work shall be purchased by the Contractor, or by any Subcontractor or Supplier, subject to any security interest, installment or sales contract or any other agreement or lien by which an interest in the materials or supplies is retained by the seller or is given to a secured party. The Contractor warrants that it has clear and good title to all materials and supplies used in the Work or for which the Contractor accepts payment in whole or in part.

**29. STANDARDS FOR MATERIALS INSTALLATION & WORKMANSHIP**

- a. Unless otherwise specifically provided in the Contract, all equipment, material, and accessories incorporated in the Work are to be new or Recycled and in first-class condition.
- b. Unless specifically approved by the Owner or required by the Contract, the Contractor shall not incorporate into the Work any materials containing asbestos or any material known by the industry to be hazardous to the health of building construction workers, maintenance workers, or occupants, or harmful to other building components, materials or products. If the Contractor becomes aware that a material required by the Contract contains asbestos or other hazardous or harmful materials, it shall notify the Owner and the A/E immediately and shall take no further steps to acquire or install any such material without first obtaining Owner approval.
- c. All workmanship shall be of the highest quality found in the building industry in every respect. All items of Work shall be done by Persons skilled in the particular task or activity to which they are assigned. In the acceptance or rejection of Work, no allowance will be made for lack of skill on the part of Persons performing the Work. Poor or inferior workmanship (as determined by the A/E, the Owner or other inspecting authorities) shall be removed and replaced at Contractor's expense such that the Work conforms to the highest quality standards of the trades concerned, or otherwise corrected to the satisfaction of the A/E, the Owner, and other inspecting authority, as applicable.
- d. Where materials, supplies or equipment are supplied with the manufacturer's printed instructions, recommendations, or directions for installation, or where such instructions, recommendations, or directions are available, installation of the items shall be in strict accordance with the manufacturer's printed instructions unless those instructions contradict the Plans or Specifications, in which case the Contractor shall notify the A/E of the inconsistency and obtain written guidance from the A/E before proceeding with any Work involving the item.
- e. Where the Specifications or Plans refer to specific codes or standards governing the installation of specified items, installation shall in all cases be in strict accordance with the referenced codes and standards. Where no reference is made to specific codes or standards, installation shall conform to the generally recognized applicable standards for first-class installation of the specific item to be installed. Contractors are expected to be proficient and skilled in their respective trades and knowledgeable of the Codes and Standards of the National Fire Protection Association ("NFPA"), National Electric Code ("NEC"), Occupational Safety and Health Act ("OSHA") and other codes and standards applicable to installations and associated work by trade.
- f. Where the manufacturer's printed instructions are not available for installation of specific items, where specific codes or standards are not referenced to govern the installation of specific items, or where there is uncertainty on the part of the Contractor concerning the installation procedures to be followed or the quality of workmanship to be maintained in the installation of specific items, the Contractor shall consult, in advance, with the A/E for approval of the installation procedures or the specific standards governing the quality of workmanship the Contractor proposes to follow or maintain during the installation of the items in question.
- g. During and/or at the completion of installation of any items, the tests designated in the Plans or Specifications necessary to assure proper and satisfactory functioning for its intended purpose shall be performed by the Contractor or by its Subcontractor responsible for the completed installation. All costs for such testing are to be included in the Contract Price. If required by the Contract Documents, the Contractor shall furnish prior to final inspection the manufacturers' certificates evidencing that products meet or exceed applicable performance, warranty and other requirements, and certificates that products have been properly installed and tested.

**30. WARRANTY OF MATERIALS AND WORKMANSHIP**

- a. The Contractor warrants that, unless otherwise specified, all materials and equipment incorporated in the Work shall be new or Recycled, in first-class condition, and in accordance with the Contract

Documents. The Contractor further warrants that the Work shall be of the highest quality and in accordance with the Contract Documents and shall be performed by Persons qualified at their respective trades.

- b. Work not conforming to these warranties shall be considered Defective.
- c. This warranty of materials and workmanship is separate and independent from and in addition to any of the Contractor's other guarantees and obligations in the Contract Documents and under Virginia law.

**31. USE OF SITE AND REMOVAL OF DEBRIS**

- a. The Contractor shall:
  - 1. Perform the Work in such a manner as not to interrupt or interfere with the operation of any existing activity on, or in proximity to, the Site or with the Work of any other separate contractor;
  - 2. Store its apparatus, materials, Supplies and equipment in such orderly fashion at the Site of the Work as will not unduly interfere with the progress of its Work or the work of any other separate contractor; and
  - 3. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.
- b. The Contractor expressly undertakes, either directly or through its Subcontractor(s), to effect all cutting, filling or patching of the Work required to make the same conform to the Plans and Specifications, and, except with the consent of the A/E, not to cut or otherwise alter the work of any other separate contractor. The Contractor shall not damage or endanger any portion of the Work or Site, including existing improvements, unless called for by the Contract.
- c. The Contractor expressly undertakes, either directly or through its Subcontractor(s), to clean up frequently all refuse, rubbish, scrap materials and debris caused by its operations, to ensure that at all times the Site shall present a neat, orderly and workmanlike appearance. No refuse, rubbish, scrap material or debris shall be left within the completed Work nor buried on the Site, but shall be removed from the Site and properly disposed of in a licensed landfill or otherwise as required by law.
- d. The Contractor expressly undertakes, either directly or through its Subcontractor(s), before Final Payment or such prior time as the Owner may require: to remove all surplus material, false Work, temporary structures, including foundations thereof, plants of any description and debris of every nature resulting from its operations and to put the Site in a neat, orderly condition; to thoroughly clean and leave reasonably dust-free all finished surfaces, including all equipment, piping, etc., on the interior of all buildings; and to clean thoroughly all glass installed under the Contract, including the removal of all paint and mortar splatters and other defacements.

If the Contractor fails to clean up as required herein, the Owner may do so and charge the costs incurred thereby to the Contractor in accordance with Section 10 (b).

- e. The Contractor shall have, on-Site, an employee certified by the Department of Environmental Quality as a Responsible Land Disturber who shall be responsible for the installation, inspection and maintenance of erosion control and stormwater management measures and devices. The Contractor shall identify this employee to the Owner and the A/E in writing prior to any land disturbance on Site. The Contractor shall prevent Site soil erosion, the runoff of silt and/or debris carrying water from the Site, and the blowing of debris off the Site in accordance with the applicable requirements and standards of the Contract and the Virginia Department of

Environmental Quality's Erosion and Sediment Control Regulations and the Virginia Stormwater Management Regulations.

**32. TEMPORARY ROADS**

Temporary roads, if required, shall be established and maintained until permanent roads are accepted, then removed and the area restored to the conditions required by the Contract Documents. Crushed rock, paving and other road materials from temporary roads shall not be left on the Site unless written permission is received from the Owner to bury the same at a location and depth approved by the Owner.

**33. SIGNS**

The Contractor may, at its option and without cost to the Owner, erect signs acceptable to the Owner on the Site for the purpose of identifying and giving directions to the Project. No signs shall be erected without prior approval of the Owner as to design, content and location.

**34. PROTECTION OF PERSONS AND PROPERTY**

- a. The Contractor expressly undertakes both directly and through its Subcontractors, to take every reasonable precaution at all times for the protection of all Persons and property at or near the Site or which may be affected by the Contractor's Work.
- b. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Any violation of safety requirements or duties or any potential safety hazard that is known to the Contractor or which is brought to the attention of the Contractor by the A/E, the Owner, or any other Persons shall be immediately abated.
- c. The provisions of all rules and regulations governing health and safety as adopted by the Safety Codes Commission of the Commonwealth of Virginia, issued by the Department of Labor and Industry under Title 40.1 of the *Code of Virginia*, shall apply to all Work under this Contract.
- d. The Contractor shall continuously maintain adequate protection of all the Work and Site from damage and shall protect the Owner's property from injury or loss arising in connection with the Work. The Contractor shall make good any damage, injury or loss caused by its operations or the Work, except as may be directly and solely due to errors in the Contract Documents or caused by agents or employees of the Owner. The Contractor shall adequately protect adjacent property to prevent any damage to it or loss of use and enjoyment by its owners. The Contractor shall provide and maintain all passageways, guard fences, lights and other facilities for protection of Persons and the Site and the Work as required by public authority, local conditions, or the Contract.
- e. In an emergency affecting the health, safety, or life of Persons, or threatening loss or damage to the Work or adjoining property, the Contractor, without special instruction or authorization from the A/E or the Owner, shall act promptly, at its discretion, to prevent such threatened loss or injury. The Contractor shall carry out any instructions or directives issued by the A/E or Owner, to prevent threatened loss or injury, immediately, without appeal. Any additional compensation or extension of time claimed by the Contractor on account of any emergency actions or measures shall be submitted and determined as provided by Section 38.
- f. When necessary for the proper protection of the Work, temporary heating of a type compatible with the Work must be provided by the Contractor, at the Contractor's expense, unless otherwise specified.

**35. CLIMATIC CONDITIONS**

The Contractor shall suspend activity on and protect any portion of the Work that may be subject to damage by climatic conditions.

**36. PAYMENTS TO CONTRACTOR**

a. Unless otherwise provided in the Contract, the Owner will make partial payments to the Contractor on the basis of a duly certified and approved Schedule of Values and Certificate for Payment (CO-12), showing the estimate of the Work performed during the preceding calendar month or work period, as recommended by the A/E. When evaluating the Contractor's Certificate for Payment, the A/E will consider the value of the Work in place, the value of approved and properly stored materials, the status of the Work in relation to the Contract Completion Date, and the estimated value of the Work remaining to achieve Final Completion. The A/E will schedule a monthly pay meeting to occur no earlier than the 25th day of the month represented by the Certificate for Payment and no later than the 5th day of the following month. The Contractor shall submit its Certificate for Payment so that it is received by the A/E and the Owner's Project Manager at least one work day prior to the date scheduled by the A/E for the monthly pay meeting. The Owner will review the estimate with the A/E and the Contractor at the monthly pay meeting, which shall be considered the receipt date, and may approve to pay any or all of the Certificate for Payment. In preparing estimates, the material delivered to the Site and preparatory Work done shall be taken into consideration, if properly documented as required by Section 20 of these General Conditions, or as may be required by the A/E, so that actual quantities supplied or performed may be verified. Materials or equipment purchased specifically for the Project, but stored off the Site within the Commonwealth of Virginia, may be considered for payment provided all of the following are accomplished prior to the submission of the Certificate for Payment in which payment for such item is requested:

1. The Contractor must notify the Owner in writing, at least ten (10) Days prior to the submission of Certificate for Payment that specific items will be stored off-Site in a designated, secured place within the Commonwealth of Virginia. The Schedule of Values must be detailed to indicate separately both the value of the material and the labor/installation for trades requesting payment for stored materials. By giving such notification and by requesting payment for material stored off-Site, the Contractor warrants that the storage location is safe and suitable for the type of material stored and that the materials are identified as being the property of the Contractor, and agrees that loss of materials stored off the Site shall not relieve the Contractor of the obligation to timely furnish these materials for the Project and to achieve the Contract Completion Date. If the storage location is more than 20 miles from the Site, the Contractor may be required to reimburse the Owner for the cost incurred for travel to the storage location by Owner and/or the A/E to verify the Contractor's Certificate for Payment for materials stored off-Site. A supplementary agreement, acceptable to Owner, shall be required for payment for materials or equipment stored at a location that is not within the Commonwealth of Virginia.

2. Contractor's notification and Certificate of Payment regarding stored materials shall:

- a. Itemize the quantity of such materials and document with invoices showing the cost of said materials;
- b. Indicate the identification markings used on the materials, which shall clearly reference the materials as for the Project;
- c. Identify the specific location of the materials, which must be within reasonable proximity to the Site and within the Commonwealth of Virginia;

- d. Include a letter from the Contractor's Surety which confirms that the Surety on the Performance Bond and the Labor and Material Payment Bond has been notified of the request for payment of materials stored off the Site and agrees that the materials are covered by the bonds; and
  - e. Include documentation establishing that the stored materials are covered by all-risk builder's risk insurance in an amount not less than the fair market value of the materials, which insurance shall include the Owner as an additional insured.
3. The A/E shall indicate, in writing, to the Owner that Submittals for materials stored off-Site have been reviewed and meet the requirements of the Contract Documents, that the stored materials meet the requirements of the Plans and Specifications, and that such materials conform to the approved Submittals. Should the A/E deem it necessary to visit the storage site to make such review, the Contractor shall bear the costs incurred therewith
  4. The Owner, through the A/E, shall notify the Contractor in writing of its decision whether to pay for materials stored off-Site.
  5. The Contractor shall notify the Owner in writing, through the A/E, when the materials are to be transferred to the Site and when the materials are received at the Site.
- b. Payment will not be made for materials or equipment stored on or off the Site which are not scheduled for incorporation into the Work within the six months next following submission of the Certificate for Payment without the prior written consent of the Owner, which consent may be withheld by the Owner if, in the Owner's sole discretion, it is not necessary to procure the materials more than six months in advance of use to assure their availability when needed.
- c. No payment shall be made to the Contractor until:
1. The Contractor furnishes to the Owner its Social Security Number (SSN), if an individual, or its Federal Employer Identification Number (FEIN), if a proprietorship, partnership, corporation or other legal entity.
  2. Certificates of Insurance and required evidence of compliance by the Contractor with all the requirements of Section 11 and Section 12, if applicable, have been delivered to the Owner.
  3. Certificates of Insurance and required evidence of compliance by each Subcontractor with the requirements of Section 11 and Section 12, if applicable, have been delivered to the Owner for payments based on Work performed by a Subcontractor.
  4. The Contractor has: (i) submitted a preliminary schedule which is acceptable to the Owner in accordance with Section 19(a); (ii) submitted a fully complete Project schedule accepted by the Owner in accordance with Section 19(a); (iii) submitted all monthly Project reports required by Section 19(d); and (iv) timely provided a recovery schedule pursuant to Section 19(e), if requested by the Owner.
- d. The Owner shall withhold five percent (5%) of each progress payment to the Contractor until the Final Payment, unless otherwise provided by any law, regulation or program of the federal government. Such retainage shall be held to assure faithful performance of the Contract and may also be used as a fund to deduct amounts due to or claimed by the Owner, including, but not limited to, payment to the Owner of all moneys due for deductive change orders, credits, uncorrected Defective Work, interest, damages, and the like. (*Code of Virginia* § 2.2-4333). The Owner may, at its sole discretion, agree on an item by item basis to release the retainage on items which are fully 100% complete and which have been accepted by the Owner as being tested and

complete and on which no further action or work will be required. Retainage which is released by the Owner shall be distributed by the Contractor in conformance with Section 37.

- e. All material and Work for which progress payments are made shall thereupon become the sole property of the Owner, but this provision shall not relieve the Contractor from the sole responsibility for all materials and Work, including those for which payment has been made, or for the restoration of any damaged materials or Defective Work. No payment shall waive any right of the Owner to require Contractor to fulfill all of the terms and conditions of the Contract Documents
- f. The Final Payment, which shall include the retainage, less any amounts due to or claimed by the Owner, shall not become due until the A/E and the Owner agree that Final Completion has been achieved and until the Contractor shall deliver to the Owner through the A/E a Certificate of Completion by the Contractor (CO-13.2) and an Affidavit of Payment of Claims (CO-13), stating that all Subcontractors and Suppliers of either labor or materials have been paid all sums claimed by them for Work performed and materials furnished in connection with this Project less retainage. Amounts due the Owner which may be withheld from the Final Payment may include, but are not limited to, amounts due pursuant to Section 3(i), Section 16(a)-(d), Section 31(d), costs incurred to repair or replace Defective Work, costs incurred as a result of the Contractor's negligent acts or omissions or omissions of those for whom the Contractor is responsible, delay damages under Section 43(h), and any liquidated or actual damages.

If all Subcontractors and Suppliers of labor and materials have not been paid the full amount claimed by them, the Contractor shall list each to which an agreed amount of money is due or which has a claim in dispute. With respect to all such Subcontractors and Suppliers, the Contractor shall provide to the Owner, along with the Affidavit of Payment of Claims (CO-13), an affidavit from each such Subcontractor and Supplier stating the amount of their Subcontract or supply contract, the percentage of completion, the amounts paid to them by the Contractor and the dates of payment, the amount of money still due if any, any interest due the Subcontractor or Supplier, and whether satisfactory arrangements have been made for the payment of said amounts. If no agreement can be reached between the Contractor and one or more Subcontractors or Suppliers as to the amounts owed to the Subcontractors or Suppliers, the Owner may, in its discretion, interplead such portion of the moneys due to the Contractor which is claimed by the Subcontractor or Supplier into a Virginia Court or Federal Court sitting in Virginia, in the manner provided by law. Said interpleader and payment into court shall be deemed a payment to the Contractor. Nothing in this Section shall be construed as creating any obligation or contractual relationship between the Owner and any Subcontractor or Supplier, and the Owner shall not be liable to any Subcontractor or Supplier on account of any failure or delay of the Owner in complying with the terms hereof.

- g. Upon successful completion of the final inspection and all Work required by the Contract, including but not limited to the delivery of Record Drawings, equipment manuals, written warranties, acceptance of the Work by the Owner and the delivery of the affidavits required in Section 36(f), the A/E shall deliver the written Certificate of Completion by the A/E (CO-13.1) to the Owner, with a copy to the Contractor, stating the entire amount of Work performed and compensation earned by the Contractor. The Owner may accept the Work for occupancy or use while asserting claims against the Contractor, disputing the amount of compensation due to the Contractor, disputing the quality of the Work, disputing Final Completion, disputing Contractor's compliance with the Contract Documents, or any other reason.
- h. Unless there is a dispute about the compensation due to the Contractor, Defective Work, quality of the Work, compliance with the Contract Documents, Final Completion, claims by the Owner, other matters in contention between the parties, or unless monies are withheld pursuant to the Comptroller's Debt Setoff Program, within thirty (30) Days after receipt and acceptance of the Certificate for Payment in proper form by the A/E at the monthly pay meeting, the Owner shall pay to the Contractor the amount approved by the A/E, less all prior payments and advances



whatsoever to or for the account of the Contractor. In the case of Final Payment, the completed Affidavit of Payment of Claims (CO-13), the Certificate of Completion by the Contractor (CO-13.2) and the Certificate of Completion by the A/E (CO-13.1) shall accompany the final Certificate for Payment which is forwarded to the Owner for payment. The date on which payment is due shall be referred to as the Payment Date. Payment shall be mailed on or before the Payment Date for amounts and Work not in dispute, subject to any set offs claimed by the Owner; provided, however in instances where further appropriations are required by the General Assembly or where the issuance of further bonds is required, in which case, payment shall be made within thirty (30) Days after the effective date of such appropriation or within thirty (30) Days after the receipt of bond proceeds by the Owner. All prior estimates and payments, including those relating to extra Work, may be corrected and adjusted in any payment and shall be corrected and adjusted in the Final Payment. In the event that any Certificate for Payment contains a defect or impropriety, the Owner shall notify the Contractor of any defect or impropriety which would prevent payment by the Payment Date within five (5) Days after receipt of the Certificate for Payment by the Owner from the A/E.

- i. Interest shall accrue on all amounts owed by the Owner to the Contractor which remain unpaid seven (7) Days following the Payment Date. Said interest shall accrue at the discounted ninety-day U.S. Treasury bill rate as established by the Weekly Auction and as reported in the publication entitled *The Wall Street Journal* on the weekday following each such Weekly Auction. During the period of time when the amounts due to the Contractor remain unpaid following the seventh (7) Day after the Payment Date, the interest accruing shall fluctuate on a weekly basis and shall be that established by the immediately prior Weekly Auction. It shall be the responsibility of the Contractor to gather and substantiate the applicable weekly interest rates to the satisfaction of the Owner and to calculate to the satisfaction of the Owner the interest due. In no event shall the rate of interest charge exceed the rate of interest charged pursuant to *Code of Virginia* § 58.1-1812. No interest shall accrue on retainage or when payment is delayed because of a dispute or disagreement between the Owner and the Contractor regarding the quantity, quality or timeliness of the Work, including, but not limited to, compliance with Contract Documents or the accuracy of any Certificate for Payment. This exception to the accrual of interest stated in the preceding sentence shall apply only to that portion of a payment which is withheld and shall apply only for the duration of the dispute. Nothing contained herein shall be interpreted to prevent the withholding of retainage to assure faithful performance of the Contract. These same provisions relating to payment of interest to the Contractor shall apply also to the computation and accrual of interest on any amounts due from the Contractor to the Owner for deductive change orders and to amounts due on any claims by the Owner. The date of mailing of any payment by the U.S. Mail is deemed to be the date of payment to the addressee. No interest penalty shall be paid to any debtor on any payment, or portion thereof, withheld pursuant to the Comptroller's Debt Setoff Program, as authorized by the Virginia Debt Collection Act (§ [2.2-4800](#) *et seq.*), commencing with the date the payment is withheld. If, as a result of an error, a payment or portion thereof is withheld, and it is determined that at the time of setoff no debt was owed to the Commonwealth, then interest shall accrue at the rate specified above on amounts withheld that remain unpaid after seven Days following the Payment Date.
- j. The acceptance by the Contractor of the Final Payment shall be and operate as a release to the Owner of all claims by the Contractor, its Subcontractors and Suppliers, and of all liability to the Contractor whatever, including liability for all things done or furnished in connection with the Work, except for things done or furnished which are the subject of unresolved claims for which the Contractor has filed a timely written Notice of intent and all other Notices and documentation required by the Contract Documents and provided a claim is submitted no later than sixty (60) Days after Final Payment. Acceptance of any interest paid by the Contractor shall be a release of the Owner from claims by the Contractor for late payment.
- k. No Certificate for Payment authorized by the A/E, and no payment, final or otherwise, no certificate of completion, nor partial or entire use or occupancy of the Work by the Owner, shall be an acceptance of any Work or materials not in accordance with the Contract, nor shall the same

relieve the Contractor of responsibility for nonconforming materials or Defective Work, or operate to release the Contractor or its Surety from any obligation under the Contract, the Standard Performance Bond and the Standard Labor and Material Payment Bond.

**37. PAYMENTS BY CONTRACTOR (*Code of Virginia*, § 2.2-4354)**

Under *Code of Virginia* § 2.2-4354, the Contractor is obligated to:

- a. Within seven (7) Days after receipt of amounts paid to the Contractor by the Owner for Work performed by the Subcontractor or Supplier under this Contract, the Contractor shall:
  1. Pay the Subcontractor or Supplier for the proportionate share of the total payment received from the Owner attributable to the Work performed by the Subcontractor or the materials furnished by the Supplier under this Contract; or
  2. Notify the Owner and the Subcontractor or Supplier, in writing, of the Contractor's intention to withhold all or a part of the Subcontractor or Supplier's payment with the reason for nonpayment.
- b. The Contractor shall pay interest to its Subcontractor or Supplier on all amounts owed by the Contractor that remain unpaid after seven (7) Days following receipt by the Contractor of payment from the Owner for Work performed by the Subcontractor or materials furnished by the Supplier, except for amounts withheld as allowed under subsection (a) (2) of this Section. Unless otherwise provided under the terms of this contract, interest shall accrue at the rate of one percent per month.
- c. The Contractor shall include in each subcontract a provision requiring the Subcontractor to include in each of its subcontracts a provision requiring each of its subcontractors to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor. Each Subcontractor shall include with its invoice to, or request for payment from, the Contractor, a certification that that Subcontractor has paid each of its suppliers and lower-tier subcontractors their proportionate share of previous payments received from the Contractor attributable to the Work performed or the materials furnished by it under this Contract.

The Contractor's obligation to pay interest to the Subcontractor or Supplier pursuant to subsection (b) of this Section is not an obligation of the Owner. A modification to this Contract shall not be made for the purpose of providing reimbursement for such interest charge. A Contractor's cost reimbursement claim shall not include any amount for reimbursement of any interest charge.

**38. CHANGES IN THE WORK**

- a. The Owner may at any time, by written order utilizing the Change Order (CO-11) and without Notice to the sureties, make changes in the Work which are within the general scope of the Contract, except that no change will be made which alone will increase the total Contract Price to an amount more than twenty percent (20%) in excess of the original Contract Price without Notice to sureties. At the time of the Preconstruction Meeting described in Section 50(b), the Contractor and the Owner shall advise each other in writing of their designees authorized to accept and/or approve Change Orders and of any limits to each designee's authority. Should any designee change or the limits of their authority change, the party initiating such change in designee or authority shall give written Notice to the other Party and the A/E within seven (7) Days. The Contractor agrees and understands that the authority of the Owner's designee is limited by *Code of Virginia*, § 2.2-4309 and any other applicable statute.

Change Orders shall be effective when signed by both parties, unless Governor approval (or by his or her designee) is required, in which event the Change Order shall be effective when signed by the Governor or his or her designee.

In any Change Order adjusting the Contract Price, the increase or decrease in the Contract Price shall be determined by one of the following methods as selected by the Owner:

1. **Fixed Price:** By a mutually agreed fixed amount adjustment to the Contract Price. The Change Order shall be substantiated by documentation from the Contractor itemizing the estimated quantities and costs of all labor, materials, and equipment required as well as any mark-up used. Any increase in the Contract Price shall include the Contractor's reasonable overhead and profit, including overhead for any unreasonable delay arising from or related to the Change Order and/or the change in the Work. See Subsections (d), (e) and (f), below.
2. **Unit Price:** By using unit prices and calculating the number of net units of Work in each part of the Work which is changed, either as the Work progresses or before Work on the change commences, and by then multiplying the calculated number of units by the applicable unit price set forth in the Contract or multiplying by a mutually agreed unit price if none was provided in the Contract. No additional percentage markup for overhead or profit shall be added to the unit prices.
3. **Cost Reimbursement:** The Owner may require the Contractor to perform change in the Work on a cost-reimbursement basis by issuing two Change Orders citing this Subsection: (a) an initiating Change Order, authorizing the changed Work; and (b) a confirming Change Order approving any adjustment in the Contract Price or the Contract Completion Date as a result of the change in the Work. The initiating Change Order shall:
  - a. Describe the scope or parameters of the change in the Work;
  - b. Describe the cost items to be itemized and verified for payment and the method of measuring the quantity of work performed;
  - c. Address the impact on the Critical Path and any adjustment to the Contract Completion Date;
  - d. Order the Contractor to proceed with the change to the Work;
  - e. Order the Contractor to keep in a form acceptable to the Owner, an accurate, itemized account of the actual cost of the change in the Work, including, but not limited to, the actual costs of labor, materials, equipment, and supplies;
  - f. Order the Contractor to annotate a copy of the Project schedule to accurately show the status of the Work at the time the initiating Change Order is issued, to show the start and finish dates of the changed Work, and the status of the Work when the changed Work is completed; and
  - g. State that a confirming Change Order will be issued to reflect any increase or decrease to the Contract Price and any change in the Contract Completion Date directly resulting from the change in the Work.

The Contractor shall sign the initiating Change Order acknowledging it will proceed with the change in the Work. The Contractor's signature on an initiating Change Order citing this Subsection 38(a)(3) shall not constitute the Contractor's agreement on the cost or time impact of the change in the Work.

Except as otherwise may be agreed to in writing by the Owner, costs incurred due to a change in the Work pursuant to this subsection 38(a)(3) shall not exceed those prevailing for the trades or crafts (based upon rates established by the U.S. Department of Labor,

Bureau of Labor Statistics, or other generally recognized cost data publication), materials, and equipment in the locality of the Project, may include only those items listed as allowable in Subsection 38(e), and shall not include any of the costs listed as not allowable in Subsection 38(f). The Owner shall be permitted, on a daily basis, to verify the Contractor's cost records and may require such additional records as are necessary to determine the cost of the change to the Work.

Within fourteen (14) Days after the completion of the change in the Work, the Contractor and the Owner shall review and reconcile all cost records and schedule information regarding the change in the Work. The parties shall prepare a confirming Change Order addressing: (i) any change in the Contract Price resulting from the change in the Work, based on the records kept and the Contractor's allowance for overhead and profit determined in accordance with the provisions set forth in Subsections 38(d), (e), and (f) below; and (ii) any change in the Contract Completion Date as a result of the change in the Work's impact on the Critical Path. If agreement on the confirming Change Order is not reached within the fourteen (14) Day period following completion of the change in the Work, the Contractor may submit a claim for the disputed cost or time as provided for in Section 47.

4. The Owner may issue a unilateral Change Order for any change in the Work stating the change in the Contract Price and/or change in the Contract Completion Date deemed appropriate by the Owner for the Work. If the Contractor objects to adjustments reflected in the unilateral Change Order, the Contractor may submit a claim for the disputed costs or time as provided for in Section 47.
- b. The Contractor shall review any Owner proposed change in the Work and shall respond in writing within fourteen (14) calendar Days after receipt of the proposed change (or such other reasonable time as the Owner may direct), stating the effect of the proposed change upon its Work, including any increase or decrease in the Contract Price or Contract Completion Date that the Contractor requests as a result of the proposed change. The Contractor shall furnish to the Owner an itemized breakdown of the quantities and prices used in computing the proposed change in Contract Price. Any change in the Contract Completion Date shall be justified as set forth in Subsection 38(g).

The Owner shall review the Contractor's proposal and respond to the Contractor within thirty (30) days of receipt. If a change to the Contract Price and Contract Completion Date are agreed upon, both parties shall sign the Change Order. If a revised Contract Price and/or Contract Completion Date are not agreed upon, the Owner may direct the Contractor to proceed pursuant to Subsections 38(a)(3) or 38(a)(4).

- c. In figuring changes, any instructions for measurement of quantities set forth in the Contract shall be followed.
- d. Overhead and profit for both additive and deductive changes in the Work (other than changes covered by unit prices) shall be paid by applying the specified percentage markups only on the net cost of the changed Work (i.e. difference in cost between original and changed Work excluding overhead and profit). Said percentages for overhead and profit shall reasonably approximate the Contractor's overhead and profit, but shall not exceed the percentages for each category listed below:
  1. If a Subcontractor does all or part of the changed Work, the Subcontractor's mark-up for overhead and profit on the Work it performs shall be a maximum of fifteen percent (15%). The Contractor's mark-up for overhead and profit on the Subcontractor's price shall be a maximum of ten percent (10%).
  2. If the Contractor does all or part of the changed Work, its markup for overhead and profit on the changed Work it performs shall be a maximum of fifteen percent (15%).

3. If a Sub-subcontractor at any tier does all or part of the changed Work, the Sub-subcontractor's markup on that Work shall be a maximum of fifteen percent (15%). The markup for overhead and profit on a Sub-subcontractor's Work by the Contractor and all intervening tiers of Subcontractors shall not exceed a total of ten percent (10%).
  4. Where Work is deleted from the Contract prior to commencement of that Work without substitution of other similar Work, one hundred percent (100%) of the Contract Price attributable to that Work shall be deducted from the Contract Price. However, in the event that equipment, product or material Submittals have been approved and orders placed for said equipment, products or materials, a lesser amount, but in no case less than eighty percent (80%) of the Contract Price attributable to that Work, shall be deducted from the Contract Price. The credit to the Owner for reduced premiums on Standard Labor and Material Payment Bonds and Standard Performance Bonds shall in all cases be one hundred percent (100%).
- e. Allowable costs for changes in the Work may include but are not limited to the following:
1. Labor costs for employees directly employed in the change in the Work, including salaries and wages plus the cost of payroll charges and fringe benefits and overtime premiums, if such premiums are explicitly authorized by the Owner.
  2. Materials incorporated into the change to the Work, including costs of transportation and storage, if applicable. If applicable, all cash discounts shall accrue to the Contractor, unless the Owner deposits funds with the Contractor to make such payments. All trade discounts, rebates, refunds, and returns from the sale of surplus materials shall accrue to the Owner.
  3. Equipment incorporated in the changed Work or equipment used directly in accomplishing the Work. If rented expressly for accomplishing the change in the Work, the cost shall be the rental rate according to the terms of the rental agreement, which the Owner shall have the right to approve. If owned by the Contractor, the costs shall be a reasonable price based upon the life expectancy of the equipment and the purchase price of the equipment. If applicable, transportation costs may be included.
  4. Costs of increases in premiums for the Standard Labor and Material Payment Bond and the Standard Performance Bond, provided coverage for the cost of the change in the Work results in such increased costs. At the Owner's request, the Contractor shall provide proof of his notification to the Surety of the change in the Work and of the Surety's agreement to include such change in its coverage. The cost of the increase in premium shall be an allowable cost but shall not be marked up.
  5. Contractor and Subcontractor overhead costs as set forth in Subsection (d) markups above.
  6. **Agreed Compensation for Overhead for Changes to Time for Completion or Contract Completion Date for Changes to the Work:** If the change in the Work also changes the Contract Completion Date by adding Days to complete the Work, an itemized accounting of the following direct Site overhead and home office overhead and other indirect overhead expenses set forth in subparagraphs (a) and (b) below may be considered as allowable costs for compensation in addition to those shown above:
    - a. **Direct Site Overhead Expenses:** The Contractor's per diem expenses, as shown by the itemized accounting, for the following allowable direct Site overhead expenses: The Site superintendent's pro-rata salary, temporary Site office trailer, and temporary Site utilities including basic telephone service,

electricity, heat, water, and sanitary / toilet facilities for each Day added. All other direct expenses are covered by and included in the Subsection 38(d) markups above.

- b. **Home Office and Other Indirect Overhead Expenses:** A five percent (5%) markup on the above direct Site overhead expenses will be allowed as compensation for the Contractor's home office overhead and all other direct or indirect overhead expenses for Days added to the Time for Completion or the Contract Completion Date for a change in the Work. All other overhead and other direct or indirect overhead expenses are covered by and included in this markup and the Subsection (d) markups above.

No direct Site, home office, or other indirect overhead shall be paid if the changed Work is done on a unit price basis unless the Contractor can demonstrate that the unit price does not include direct and indirect overhead costs.

7. Any other costs directly attributable to the change in the Work with the exception of those set forth in Subsection 38(f) below.

f. Allowable costs for changes in the Work shall not include the following:

1. Costs due to the negligence of the Contractor, any Subcontractor, Supplier, their employees, or other persons for whom the Contractor is responsible, including, but not limited to, costs for the correction of Defective Work, for improper disposal of material, for equipment wrongly supplied, for delay in performing the Work, or for delay in obtaining materials or equipment.
2. Home office expenses including payroll costs for the Contractor's officers, executives, administrators, accountants, counsel, timekeepers, clerks, and other similar administrative personnel employed by the Contractor, whether at the Site or in the Contractor's principal or branch office for general administration of the Work. These costs are deemed overhead included in the percentage markups allowable in Subsections 38(d) above.
3. Home and field office expenses not itemized in Subsection 38(e) (6) above. Such items include, but are not limited to, expenses of Contractor's home and branch offices, Contractor's capital expenses, interest on Contractor's capital used for the Work, charges for delinquent payments, small tools, incidental job costs, rent, utilities, telephone and office equipment, and other general overhead expenses.
4. Other items reasonably determined by the Owner to not be allowed.

g. All Change Orders, except initiating Change Orders authorizing work pursuant to Subsection 38(a)(3) procedures, must state that the Contract Completion Date is not changed or is either increased or decreased by a specific number of Days. The old Time for Completion and, if changed, the new Time for Completion also must be stated.

If the Contractor requests an extension to the Contract Completion Date, it must provide written justification for the extension to the A/E and to the Owner. No extension to the Contract Completion Date shall be allowed unless, and then only to the extent that, the additional or changed Work increases the length of the Critical Path beyond the Contract Completion Date. Extensions to the Contract Completion Date will be granted only when an excusable delay exceeds the Total Float in the activity or path of activities affected by the Change Order. If approved, the increase in time required to complete the Work shall be added to the Contract Completion Date.

The Owner may decrease, by Change Order, the Contract Completion Date when an Owner-requested deletion from the Work results in a decrease in the actual time required to achieve

Substantial Completion of the Work. The Contractor may submit a request for an earlier Contract Completion Date under the procedures and subject to the considerations set forth in Section 19(f). No request for an earlier Contract Completion Date shall be considered for approval unless the proposed shorter schedule is otherwise acceptable under Sections 19(b) or (c), whichever is applicable.

With the exception of Change Orders under Subsection 38(a) (3), which shall arrive at a change to the Contract Price and Contract Completion Date using the procedures set forth therein, each Change Order shall include all time and monetary impacts of the change, whether the Change Order is considered alone or with all other changes during the course of the Project. Change Orders issued without a change to the Contract Completion Date and/or Contract Price conclusively establish that the change in the Work reflected by that Change Order had no impact on the Contract Price and/or Contract Completion Date. The parties may mutually agree in writing to postpone a determination of the time-related impacts of a change in the Work for a period of not more than forty-five (45) Days following completion of the change in the Work to give the Contractor an opportunity to submit documentation substantiating any requested change in the Contract Completion Date or Contract Price. During any such postponement, all Work shall proceed, unless the Owner agrees otherwise. The Contractor's failure to submit all required substantiating documentation during a forty-five (45) Day postponement shall conclusively establish that the change in the Work did not impact nor require an adjustment of the Contract Price and Contract Completion Date.

If at any time there is a delay in the Critical Path of the Work due to a postponement, the Contractor's efforts to justify an extension of the Contract Completion Date or an increase in the Contract Price, or the Contractor's refusal to proceed with any of the Work, such delay and any Contractor costs resulting from it shall not serve as the basis for the extension of the Contract Completion Date or for an increase in the Contract Price.

- h. The acceptance by the Contractor of any payment made by the Owner under a Change Order shall be and operate as a release to the Owner of all demands and claims by the Contractor to additional compensation or an adjustment of the Contract Price or Contract Completion Date for all things done or furnished in connection with the Work described in the Change Order. The execution of any Change Order by the Owner shall not be an acceptance of any Work or materials not in accordance with the Contract Documents, nor shall it relieve the Contractor of responsibility for faulty materials, Defective Work or poor workmanship or operate to release the Contractor or its surety from any obligation arising under the Contract, the Standard Performance Bond, or the Standard Labor and Material Payment Bond.
- i. Payments will not be made for any Work, labor, or materials performed on a unit price or a Subsection 38(a)(3) basis until the Contractor has furnished the Owner documents, certified as true and correct by an authorized officer or agent of the Contractor, evidencing the cost of such Work, labor, and materials. The Owner may require any or all of the following documentation to be provided by the Contractor.

**For Work performed on a Unit Price basis:**

1. Certified measurements of authorized and approved excavations, over-excavations, fills and/or backfills, and similar work; and/or
2. Certified measurements of piling installed, caissons installed, and similar work; and/or
3. Daily records of waste materials removed from the Site and/or fill materials imported to the Site.
4. Other measurements as appropriate to establish the actual quantities of work being performed on a Unit Price basis.

**For Work performed on a Subsection 38(a)(3) basis:**

1. Certified payroll records showing the name, classification, date, daily hours, total hours, rate, and extension for each laborer, foreman, supervisor, or other worker;
2. Equipment type & model, dates, daily hours, total hours, rental rate, or other specified rate and extension for each unit of equipment;
3. Invoices for materials showing quantities, prices, and extensions;
4. Daily records of waste materials removed from the Site and/or fill materials imported to the Site;
5. Certified measurements of over-excavations, piling installed and similar work;
6. Transportation records for materials, including prices, loads, and extensions.

Requests for payment shall be accompanied and supported by invoices for all materials used and for all transportation charges claimed. If materials come from the Contractor's own stock, then an affidavit may be furnished, in lieu of invoices, certifying quantities, prices, etc. to support the actual cost.

**39. EXTRAS**

If the Contractor claims that any instructions given to him by the A/E or by the Owner, by drawings or otherwise, require extra work outside the scope of the Contract, then, except in emergencies endangering life or property, he shall give the A/E and the Owner written Notice thereof before proceeding to execute the extra work. Said Notice shall be given promptly enough to avoid delaying the Work and in no instance later than fourteen (14) Days after the receipt of such instructions. If it is not immediately clear to the Contractor that a request or instruction involves extra Work outside the scope of the Contract, then written Notice shall be sufficient if it's given as soon as possible after Contractor's realization that a request or instruction involves extra Work, but in no event later than fourteen (14) Days after the start of such extra Work. If the Owner agrees, a Change Order shall be issued as provided in Section 38 for the extra work and any additional compensation shall be determined by one of the methods provided in Subsection 38(a), as selected by the Owner. If the Owner does not agree, then the Contractor may submit a claim for the disputed cost or time as provided for in Section 47. No claim for additional compensation for extra work will be considered unless the Contractor timely has provided the required Notice.

**40. CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT**

If the Work should be stopped under an order of any court or other public authority for a period of ninety (90) Days through no fault of the Contractor or anyone employed by it, or if the Owner should fail to pay to the Contractor within thirty (30) Days any sum certified by the A/E when no dispute exists as to the sum due or any requirement of the Contract, then the Contractor may, upon ten (10) Days written Notice to the Owner and the A/E, stop Work or terminate the Contract and recover from the Owner payment for the cost of the Work actually performed, together with overhead and profit thereon, but profit on the Work performed shall be recovered only to the extent that the Contractor can demonstrate that it would have had profit on the entire Contract if it had completed the Work. The Contractor may not receive profit or any other type of compensation for parts of the Work not performed. The Contractor may recover the reasonable cost of physically closing down the Site, but no other costs of termination. The Owner may offset any claims it may have against the Contractor against the amounts due to the Contractor. In no event shall termination of the Contract by the Contractor terminate the obligations of the Contractor's surety on its payment and performance bonds.



**41. OWNER'S RIGHT TO TERMINATE THE CONTRACT FOR CAUSE**

- a. If the Contractor should be adjudged as bankrupt, or if it should make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of its insolvency, the Owner may terminate the Contract. If the Contractor should refuse or should repeatedly fail, except in cases for which extension of time is provided, to supply enough properly skilled tradespeople or laborers or proper materials and equipment, or if it should fail to perform the Work in a diligent, efficient, workmanlike, skillful, or careful manner, or if it should fail or refuse to perform the Work in accordance with the Contract Documents, or if it should fail to make prompt payment to Subcontractors or Suppliers of material or labor, or if it should disregard laws, ordinances, building codes or the written instructions of the A/E or the Owner, or otherwise be in substantial, willful or repeated violation of any provision of the Contract, then the Owner may terminate the Contract.
- b. Prior to termination of the Contract, the Owner shall give the Contractor and its surety ten (10) Days' Notice of such termination and allow ten (10) Days during which the Contractor and/or its surety may rectify the basis for the Notice. If rectified to the satisfaction of the Owner within said ten (10) Days, the Owner may rescind its notice of termination. If the basis for the termination is not rectified within said ten (10) Days, the termination for cause shall become effective at the end of the ten (10) Day period without further Notice to the Contractor. At any time, the Owner may, in writing, postpone the effective date of the termination for cause, at its sole discretion, if it should receive reassurances from the Contractor and/or its surety that the basis for the termination will be remedied in a time and manner which the Owner finds acceptable. If at any time after such a postponement, the Owner determines that Contractor and/or its surety has not or is not likely to rectify the causes of termination in an acceptable manner or to do so within the time allowed, then the Owner may immediately terminate the Contract for cause, without the necessity of further ten (10) Day Notice, by notifying the Contractor and its surety in writing of the termination. In no event shall termination for cause terminate the obligations of the Contractor's surety on its payment and performance bonds.
- c. Upon termination of the Contract becoming effective, the Owner shall take possession of the Site and of all materials, tools and equipment thereon and shall proceed as follows:
  1. **No Security or Bonds Provided:** If no security has been required pursuant to Section 8, the Owner shall finish the Work by whatever method the Owner deems reasonable or expedient. If the expense of finishing the Work, including compensation for additional managerial and administrative services, shall exceed the unpaid balance of the Contract Price, the Contractor shall pay the difference to the Owner, together with any other expenses of terminating the Contract and having it completed by others.
  2. **Security or Bonds Provided:** If security has been required and provided pursuant to Section 8 herein, the Owner shall provide Notice to the Surety that termination of the Contract became effective and proceed as set forth in the Standard Performance Bond (CO-10), and the Terms and Conditions therein. If the expense of finishing the Work, including compensation for additional managerial and administrative services, shall exceed the unpaid balance of the Contract Price and all amounts due under the Standard Performance Bond, the Contractor shall pay the difference to the Owner, together with any other expenses of terminating the Contract and having it completed by others.
- d. If it should be judicially determined that the Owner improperly terminated this Contract for cause, then the termination shall be deemed to be a termination for the convenience of the Owner and the Contractor's rights and remedies shall be solely limited to those provided by Section 42 of these General Conditions.
- e. Termination of the Contract for cause is in addition to and without prejudice to any other right or remedy of the Owner. Any actions by the Owner permitted herein shall not be deemed a waiver of

any other right or remedy of the Owner under the Contract or under the law. The Owner may offset any claims it may have against the Contractor against the amounts due to the Contractor. The provisions of this Section shall survive termination of the Contract.

- f. The provisions of Sections 3(j), 9(e), 14, 30 and 45 also shall survive termination of the Contract for cause.

#### 42. TERMINATION BY OWNER FOR CONVENIENCE

- a. The Owner may terminate this Contract, in whole or in part, at any time without cause upon giving the Contractor written Notice of such termination. Upon Notice of termination for convenience, the Contractor shall immediately cease Work and remove from the Site all of its labor forces, equipment and such of its materials as Owner elects not to purchase or to assume in the manner hereinafter provided. The Contractor also shall take such steps as Owner may require to assign to the Owner the Contractor's interest in all Subcontracts and purchase orders designated by Owner. After all such steps have been taken to Owner's satisfaction, the Contractor shall receive as full compensation the following:

1. Amounts due for Work performed in accordance with the Contract subsequent to the latest approved Schedule of Values and Certificate for Payment (CO-12) through the date of termination; and
2. All amounts due under Contract for Work completed prior to the date of termination; and
3. Reasonable compensation for the actual cost of demobilization incurred by the Contractor as a direct result of termination for convenience, plus overhead not to exceed 15 percent (15%) of the direct costs of demobilization.

The Contractor agrees it shall not be entitled to any additional compensation, including but not limited to loss of revenue, income, profit, business, reputation, or bonding capacity, consequential damages or lost profits, but shall only receive payment upon termination for convenience as stated in this Subsection 42(a). The Owner may offset any claims it may have against the Contractor against the amounts due to the Contractor. Upon payment of the amounts stated in this Subsection 42(a), Owner shall have no further obligations to Contractor of any nature.

- b. In no event shall termination for the convenience of the Owner terminate the obligations of the Contractor's surety on the payment and performance bonds. The provisions of Sections 3(j), 9(e), 14, 30 and 45 also shall survive termination of the Contract for convenience.
- c. Any actions by the Owner permitted herein shall not be deemed a waiver of any other right or remedy of the Owner under the Contract or under the law. The provisions of this Section shall survive termination of the Contract.

#### 43. DAMAGES FOR DELAYS; EXTENSION OF TIME

- a. **Excusable Non-Compensable Delays:** If the Critical Path is delayed by strikes, fires, unusual delays in transportation, unavoidable casualties, or other causes outside the control of the Owner and the Contractor, with the exception of delays caused by weather which are addressed in Section 6, and the Contractor seeks an extension of the Contract Completion Date, then the Contractor shall give the Owner and A/E written Notice of the delay not later than fourteen (14) Days following the inception of the delay. The Contractor shall give written Notice to the Owner and A/E of the termination of the delay event not later than fourteen (14) Days after the delay has ceased. Within twenty (20) Days after the delay event has ceased, Contractor shall submit to the Owner and the A/E, the Contractors' written request for an extension of the Contract Completion Date, specifically stating the cause of the delay, the number of days of extension requested, and an analysis of the delay event's impact on the Critical Path. If the Owner agrees that the Critical Path

has been impacted by the delay event, the Owner shall extend the Contract Completion Date for the length of time that the Critical Path was delayed. The Contractor shall not be charged with liquidated or actual damages for such period of Critical Path delay nor shall the Contractor be due compensation or damages of any kind, under any theory of law, as a result of such Critical Path delay, the impact of such delay, or its acceleration of Work as a result of such delay.

- b. **Excusable Compensable Delays:** If the Critical Path unreasonably is delayed by acts or omissions of the Owner, or its agents, contractors, or employees due to causes within the Owner's control, and the Contractor seeks an extension of the Contract Completion Date and/or additional compensation due to the unreasonable delay, then the Contractor shall notify the Owner and the A/E immediately at the time of the occurrence giving rise to the delay by the fastest means available. The Contractors also shall give written Notice to the Owner and A/E no later than two (2) business days after inception of the delay. The Contractor's written Notice shall specify the nature of the delay claimed by the Contractor, the cause of the delay, and the impact of the delay on the Critical Path. The Owner shall have three (3) business days to respond to the Contractor's Notice with a resolution, remedy, direction to alleviate the delay, or rejection of the Contractor's requested relief. The Owner's failure to respond within the time required shall be deemed to be a denial of the Contractor's entitlement to an extension of the Contract Completion Date and additional compensation. The Contractor shall also give written Notice to the Owner and A/E of the termination of the delay event not later than fourteen (14) Days after the delay has ceased. Within twenty (20) Days after the delay event has ceased, Contractor shall submit to the Owner and the A/E, the Contractor's written request for an extension of the Contract Completion Date, specifically stating the cause of the delay, the number of days of extension requested, a calculation of the additional compensation sought, and an analysis of the delay event's impact on the Critical Path. Requests for additional compensation must be substantiated by itemized data and records demonstrating that the costs incurred by the Contractor are directly attributable to the delay and shall be calculated from the Contract Completion Date, not using any early completion planned or scheduled by the Contractor unless a Change Order has been executed pursuant to Section 19(f) changing the Contract Completion Date to reflect such early completion. If and to the extent that a delay is caused by or due to the Owner or A/E taking any actions permitted or required by the Contract, the Contractor shall be entitled to an extension of the Contract Completion Date or additional compensation only for the portion of the delay that is unreasonable, if any.
- c. **Non-Excusable Non-Compensable Delays:** The Contractor shall not be entitled to an extension of the Contract Completion Date or to any additional compensation if and to the extent a delay is: (1) caused by acts, omissions, fault, or negligence of the Contractor or its Subcontractors, agents or employees; (2) arises from foreseeable causes within the control of the Contractor or its Subcontractors, agents or employees, including, but not limited to, Defective Work, poor workmanship, improper or inferior materials, Defective Work which must be corrected before dependent work can proceed, Defective Work for which corrective action must be determined before like work can proceed, from incomplete, incorrect, or unacceptable Submittals or samples, or the failure to furnish enough or properly skilled workers, proper materials or necessary equipment to perform the work in a timely manner in accordance with the Project schedule; or (3) due to causes that would entitle the Owner to recover delay costs or other damages from Contractor.
- d. No extension of time or additional compensation will be allowed unless the Contractor demonstrates that the delay directly impacted the Critical Path of the most current approved Project schedule and that all Float has been consumed. No extension of time or additional compensation will be allowed if the Contractor failed to provide all Notice and information in the manner and within the time periods set forth in Subsections 43(a) or (b) above, whichever applies. Failure to timely provide all required information and Notices shall preclude an extension of the Contract Completion Date or payment of additional compensation based upon that cause.
- e. If the Contractor makes a claim against the Owner for costs or damages, the Contractor shall be liable to and shall pay to the Owner that percentage of all costs incurred by the Owner in

investigating, analyzing, negotiating, and litigating or arbitrating that percentage of the claim which is determined through litigation or arbitration to be false or to have no basis in law or in fact. (*Code of Virginia, § 2.2-4335*).

- f. Any change in the Time for Completion or Contract Completion Date shall be accomplished only by issuance of a Change Order.
- g. **Agreed Compensation/Liquidated Damages for Contractor Delay:** If liquidated damages are not established in the Supplemental General Conditions, the Contractor shall be liable for any and all actual damages sustained by Owner as a result of a delay for which Contractor is responsible. In addition to damages for delay, whether liquidated or actual, the Contractor shall also be liable for any and all actual damages sustained by the Owner as a result of any other breach of the Contract, including, but not limited to, Defective Work or abandonment of the Contract.

#### 44. INSPECTION FOR SUBSTANTIAL COMPLETION & FINAL COMPLETION

- a. The Contractor shall advise the Owner using the Certificate of Partial or Substantial Completion by the Contractor (CO-13.2a) of the date when the Work or designated portion thereof will be substantially complete and ready for inspection and testing by Owner to determine if Substantial Completion has been achieved. Contractor shall deliver Form CO-13.2a to the A/E at least ten (10) Days in advance of the date identified on the Form CO-13.2a. The A/E shall then attach his or her written endorsement as to whether the Work will be ready for inspection and testing on the date identified on the Form CO-13.2a. The A/E's endorsement is a convenience to the Owner only and shall not relieve the Contractor of its responsibility nor shall the A/E's endorsement be deemed to evidence or establish that the Work was substantially complete or ready for inspection and testing. Inspection and testing shall take place at a time(s) mutually agreeable to the Contractor, Owner, A/E, and Building Official.

The inspection shall include a demonstration by the Contractor that all equipment, systems and operable components of the Project function properly and in accordance with the Contract Documents. The Contractor shall furnish access for the inspection and testing as provided in Section 21 of these General Conditions. The inspection and testing shall determine whether Substantial Completion has been accomplished and shall result in a written list of unfinished Work and Defective Work, commonly referred to as a "punch list", which must be completed and corrected prior to Final Completion.

If, after successful completion of all testing, the Architect/ Engineer determines that the Work, either in whole or in part, has achieved Substantial Completion, the A/E shall notify the Owner of such, in writing, using the Certificate of Partial or Substantial Completion by the A/E (CO-13.1a).

The Owner shall notify the Contractor, in writing, of the date the Owner accepts the Work, or the specified portion thereof, as having achieved Substantial Completion or, if it is not, shall notify the Contractor of the deficiencies to be corrected or completed before such Work will be accepted as substantially complete.

- b. The Contractor shall advise the Owner, in writing using the Certificate of Completion by the Contractor (CO-13.2) of the date when the Work has reached or will reach Final Completion and will be ready for final inspection and testing. Contractor shall deliver Form CO-13.2 to the A/E at least five (5) Days in advance of the date identified on the Form CO-13.2. The A/E shall then attach his or her written endorsement as to whether the Work will be ready for inspection and testing on the date identified on Form CO-13.2. The A/E's endorsement is a convenience to the Owner only and shall not relieve the Contractor of its responsibility nor shall the A/E's endorsement be deemed to evidence or establish that the Work achieved Final Completion. Final Completion inspection and any necessary testing shall be conducted in the same manner as the inspection for Substantial Completion. The Owner shall not establish the Final Completion Date until the Work is finally and totally complete, including the completion of punch list items,

submission of all required documentation, and elimination and correction of all Defective Work.

- c. Representatives of the Contractor, Owner, A/E, and Building Official will participate in the Substantial Completion and/or Final Completion inspections. The A/E shall conduct and document the inspections. The Owner may elect to have other persons of its choosing also participate in the inspections. If one or more Substantial or Final Completion re-inspections are required, the Contractor shall reimburse the Owner for all costs of re-inspection or, at the Owner's option, the costs may be deducted from payments due to the Contractor.
- d. A representative of the State Fire Marshal's Office will either be present at the Substantial and Final Completion inspections or otherwise inspect the completed Work and report any fire safety deficiencies to the Building Official. The State Fire Marshal will advise the Owner and Contractor of those deficiencies.
- e. Approval of Work at or as a result of any inspection required herein shall not release the Contractor or its surety from responsibility for complying with the Contract.

**45. GUARANTEE OF WORK AND INDEMNIFICATION**

- a. Except as otherwise specified or required, the Contractor guarantees all Work, materials, equipment, and workmanship conform to the requirements of the Contract Documents and are free from defects, imperfections, or non-conformities, normal wear and tear excepted, for a period of one (1) year from the Final Completion Date. Equipment and facilities which have seasonal limitations on their operation (e.g. heating or air conditioning units) shall be guaranteed for one (1) full year from the date of the equipment's first seasonally appropriate test and acceptance, in writing, by the Owner. Where the Owner agrees to take Beneficial Occupancy of a portion or phase of the Work which has been determined to be substantially complete before the entire Work achieves Final Completion, the guarantee for that portion or phase shall begin on the date that the Owner takes Beneficial Occupancy, unless otherwise specified in the Supplemental General Conditions, Special Conditions, or by separate agreement. This guarantee is separate and apart from any manufacturers' warranties and the warranty set forth in Section 30. At six (6) months and eleven (11) months after Substantial Completion, the Contractor shall meet with the Owner to review the status of and assign value to any unresolved warranty, guarantee, and punch list items.
- b. If, within any guarantee period, Work which is not in accordance with the Contract, Defective Work, or inferior material, equipment or workmanship is noted by the Owner or A/E which requires or renders necessary repairs or changes in connection with the guaranteed Work, the Contractor shall, promptly upon receipt of Notice from the Owner, such Notice being given not later than two weeks after the guarantee period expires, and without expense to the Owner:
  - 1. Correct, repair, replace or otherwise place in satisfactory condition all Defective Work, defects, nonconformity, inferior materials, equipment or workmanship;
  - 2. Make good all damage to the structure or Site or equipment or contents thereof, which, in the opinion of the Owner or the A/E, is the result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the requirements of the Contract; and
  - 3. Make good any Work or materials or the equipment and contents of structures and/or Site disturbance that results from fulfilling the requirements of the guarantee.
- c. In any case when in fulfilling the requirements of the Contract and this guarantee or any other guarantee or warranty the Contractor disturbs any work performed by a separate contractor, the Contractor shall restore such work to a condition satisfactory to the A/E and Owner and guarantee such restored work to the same extent as if it was guaranteed under this Contract.

- d. If the Contractor, after Notice, fails to proceed promptly to comply with the obligations of this Section 45, and the surety, after Notice, fails to cure the Contractor's default as provided in Section 41, the Owner may undertake all needed corrections or repairs and the Contractor and its surety shall be liable for all expenses incurred.
- e. All special warranties and guarantees applicable to definite parts of the Work that may be stipulated in or required by the Contract Documents shall be subject to the terms of this Section during the first year of such special warranty or guarantee. The guarantee of this Section shall be in addition to and not in lieu of all other warranties, express or implied, applicable to or arising from this Contract or by law.
- f. Nothing contained in this Section shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including liability for Defective Work under Section 30, for indemnity or for breach of the Contract. This Section relates only to the specific obligation of the Contractor to correct the Work and does not limit the time within which its obligation to comply with the Contract Documents otherwise may be enforced, nor the time within which legal proceedings may be commenced to establish the Contractor's liability with respect to its obligations under the Contract Documents.
- g. In the event the Work of the Contractor is to be modified by another contractor, either before or after the Final Inspection, the Contractor shall remain responsible in all respects under this Section's Guarantee of Work and under any other warranties or guarantees, express or implied, applicable to or arising from this Contract or by law. However, the Contractor shall not be responsible for any defects in material or workmanship introduced by another Contractor modifying Contractor's Work. The Contractor and any contractor making modifications shall each be solely responsible for its respective work. A contractor modifying the Contractor's Work shall be responsible for any damage to or defect introduced into the Work by its modification.

If Contractor claims that a subsequent contractor has introduced defects of materials and/or workmanship into its Work, Contractor shall demonstrate clearly the nature and extent of such introduced defects and the other contractor's responsibility for those defects. Any contractor modifying the work of another shall have the same burden if it asserts that defects in its work were caused by the contractor whose work is modified.

- h. The Contractor shall indemnify and hold harmless the Commonwealth of Virginia, the Owner and the Owner's consultants, representatives, agents and employees from and against any and all claims, causes of action, losses, costs, expenses or damages, including but not limited to attorney's fees, of any kind or nature whatsoever, arising from or relating to any bodily injury, including sickness, disease or death, any property damage, and any monetary loss, that results from or arises out of the Work performed by the Contractor, or by or in consequence of the Contractor's neglect in safeguarding the Work, its use of unacceptable materials in the Work, or resulting from any act, omission, negligence, or misconduct of the Contractor, any of its subcontractors, anyone directly or indirectly employed by them or anyone for whose acts the Contractor is or may be liable. The Owner may retain as much of the monies due the Contractor under the Contract as the Owner considers necessary to ensure that a fund will be available to pay a settlement or judgment of such suits, actions, or claims. If insufficient monies are or will become due, the Contractor's surety and/or insurers will not be released from liability until all such claims and actions have been settled and suitable evidence to that effect has been furnished the Owner.

#### 46. ASSIGNMENTS

Neither party to the Contract shall assign the Contract in whole or any part without the written consent of the other, nor shall the Contractor assign any monies due or to become due to him hereunder, without the prior written consent of the Owner. Consent to assignment shall not be unreasonably withheld. No assignment shall relieve any party from its obligations under the Contract.

**47. CONTRACTUAL DISPUTES (*Code of Virginia*, § 2.2-4363)**

- a. Contractual claims, whether for money or for other relief, shall be submitted, in writing, no later than sixty (60) Days after Final Payment; however, written Notice of the Contractor's intention to file such claim must be given to the Owner within fourteen (14) Days of the time of the occurrence or beginning of the Work upon which the claim is based. Such Notice shall state that it is a "notice of intent to file a claim" and include a written statement describing the act or omission of the Owner or its agents that allegedly caused or may cause damage to the Contractor and the nature of the claimed damage. Verbal notice, the Owner's actual knowledge, or a written notice given more than fourteen (14) Days after the occurrence or beginning of the Work upon which the claim is based, shall not be sufficient to satisfy the requirements of this Section. All claims shall state that they are "claims" pursuant to this Section, be submitted along with all practically available supporting evidence and documentation and the certification required by Subsection 47(f), and request a final decision. Certificates for payment, applications for payment, vouchers, invoices and similar requests for payment submitted for work done by the Contractor in accordance with the expected contract performance are routine submissions and are not claims under this Section. Proposed or requested Change Orders, demands for monetary compensation or other relief, and correspondence and e-mails to the Owner or its representatives, which do not strictly comply with the requirements of this Section, are not claims under this Section. Failure to timely provide notice of intent to submit a claim shall preclude any relief to the Contractor, including but not limited to an extension of the Contract Completion Date or payment of additional compensation.
- b. Although the Contractor may be required to submit certain classes of claims prior to Final Payment, and the Contractor is not prevented from submitting claims during the pendency of the Work, the Owner shall not be obligated to render a final written decision on any claim until after Final Payment. No written decision denying a claim or addressing issues related to the claim shall be considered a denial pursuant to this Section unless the written decision makes express reference to this Section and is signed by the Agency head or his or her designee. The Contractor may not institute legal action prior to receipt of the Owner's final written decision on the claim unless the Owner fails to render such a decision within ninety (90) Days of submission of the claim or within ninety (90) Days of Final Payment, whichever is later.
- c. The decision of the Owner shall be final and conclusive unless the Contractor within six (6) months of the date of the final decision on a claim, initiates legal action as provided in *Code of Virginia* § 2.2-4364. Failure of the Owner to render a timely decision on a claim shall not result in the Contractor being awarded the relief claimed nor shall it result in any other relief or penalty. The sole result of the Owner's failure to render a timely decision shall be the Contractor's right to immediately institute legal action. No administrative appeals procedure pursuant to § 2.2-4365 of the *Code of Virginia* has been established for contractual claims under this Contract.
- d. Pursuant to *Code of Virginia*, § 2.2-4366, Alternative Dispute Resolution, the Owner may enter into an agreement with the Contractor to submit disputes arising from the performance of this Contract to arbitration and utilize mediation and other alternative dispute resolution procedures. However, such procedures entered into by the Owner, the Commonwealth, or any department, institution, division, commission, board or bureau thereof, shall be non-binding and subject to *Code of Virginia* § 2.2-514, as applicable. The details for the implementation of Alternative Dispute Resolution are provided in CPSM Section 3.2.7.
- e. In the event that a dispute, claim or controversy between the Owner and the Contractor arises regarding the requirements of the Contract, the performance of the Work, payment due the Contractor, the terms of any Change Order, or otherwise, the Contractor shall not stop, suspend or delay the Work or any part of the Work to be performed under the Contract, or under any Change Order, or as ordered by the Owner. The Contractor shall continue to diligently prosecute the Work to completion, including work required in any Change Order or as directed by the Owner.

- f. The Contractor shall submit a Contractor's Claim Certification (DGS-30-234) certifying that the claim is a true and accurate representation of the claim. Claims submitted without the Contractor's Claim Certification will be deemed incomplete and will not be considered.
- g. The compensation expressly provided for by this Contract shall be the Contractor's sole available compensation for the acts, omissions or breaches by the Owner. These remedies shall survive termination or breach of the Contract.

**48. ASBESTOS**

- a. This subsection applies to projects involving existing buildings where asbestos abatement is not a part of the Work, when the scope of the Project has been reviewed and a comprehensive survey conducted by an individual licensed by the Virginia Department of Professional and Occupational Regulation to conduct building inspections for asbestos-containing materials in buildings, and where the Owner has attempted to remove or encapsulate all asbestos-containing material that may become friable or damaged during this Project.

Prior to commencement of Work, the results of the comprehensive survey or any other asbestos survey shall be made available to the Contractor, who shall be responsible for performing his Work so as not to disturb any remaining asbestos, encapsulated or otherwise, identified in such survey or surveys.

If the Contractor discovers or inadvertently disturbs any material that he knows, should have known or has reason to believe, may contain asbestos that has not been previously identified, was overlooked during the removal, was deemed not to be friable or was encapsulated, the Contractor shall stop Work in the area containing or suspected to contain the asbestos, secure the area, and notify the Owner and the A/E immediately by telephone or in-person with written Notice as soon as possible. The Owner will have the suspect material sampled.

If the sample is positive and must be disturbed in the course of the Work, the Owner shall have the material repaired or removed and shall pay for the bulk sample analysis.

Except as provided in *Code of Virginia* § 11-4.1, if the material disturbed is not within the Contractor's authorized Work and/or Work area or under this Contract, the Contractor shall pay for all associated sampling and abatement costs.

- b. If asbestos abatement is included as a part of the Work, the Contractor shall assure that the asbestos abatement work is accomplished by those duly licensed as described in Section 3 of these General Conditions and in accordance with the specific requirements of the Contract and all applicable laws and regulations.
- c. If asbestos abatement is included as part of the Work, the licensed asbestos Subcontractor shall obtain the insurance required under Section 11(b)(4) of these General Conditions.

**49. TRAINING, OPERATION AND MAINTENANCE OF EQUIPMENT**

- a. As a part of the Work, the Contractor in conjunction with his Subcontractors and Suppliers shall provide the Owner's operations and maintenance personnel with adequate instruction and training in the proper operation and maintenance of any equipment, systems, and related controls provided or altered in the Work. The training requirements may be further defined in the Specifications.
- b. The Contractor shall provide the Owner with a minimum of two (2) copies of operating, maintenance and parts manuals for all equipment and systems provided in the Work. Further specific requirements may be indicated in the Specifications.



50. PROJECT MEETINGS

- a. The intention of this Section is that the Contractor, the Owner and the A/E have timely exchange of information and cooperate to accomplish the Work as required by the Contract Documents. The Contractor is responsible for managing the Work, obtaining approvals and requesting clarifications on a timely basis. The Owner and A/E are responsible for making a reasonable effort to provide timely responses to the Contractor.
- b. **Preconstruction Meeting:** Prior to the start of construction and no later than 15 Days after the Notice to Proceed, a “Preconstruction” meeting shall be held with attendees to include the Owner’s Project Manager and Project Inspector, the A/E’s project manager and representatives of each design discipline involved in the Project, the Regional Fire Marshal, the Contractor’s project manager and superintendent (and scheduler, if Contractor desires), and representatives of the Contractor’s major Subcontractors. The purpose of the meeting is to clarify and discuss the specifics related to, but not limited to, the following:
  1. Persons involved from each entity and their chain of authority including the names of persons authorized to sign Change Orders and any limits to their authority. Name of Contractor’s on-site certified Responsible Land Disturber.
  2. Names, addresses, email addresses, telephone numbers and FAX numbers to be used for Requests for Information (RFI), Requests for Clarification (RFC), Requests for Proposals (RFP), shop drawings, Submittals, and Notice.
  3. Contractor’s proposed construction schedule, the requirements for schedule updates and recovery schedules, assessment and management of risks to on-time and on-budget completion, and Owner’s sequencing requirements, if any.
  4. Schedule of Values and Certificate for Payment (CO-12) requirements and procedures.
  5. Procedures for shop drawings, product data and Submittals.
  6. Procedures for handling Field Orders and Change Order (CO-11).
  7. Procedures for Contractor’s request for time extension, if any.
  8. Construction Site requirements, procedures and clarifications to include:
    - Manner of conducting the Work
    - Site specialties such as dust and erosion control, stormwater management, project signs, clean up and housekeeping, temporary facilities, utilities, security, and traffic
    - Safety
    - Layout of the Work
    - Quality control, testing, inspections, and notices required
    - Site visits by the A/E and others
    - Owner’s Project Inspector duties
    - Running Punch List
    - As-Built Drawings
  9. Procedures and documentation of differing or unforeseen Site conditions.
  10. Monthly Pay Meeting.
  11. Assignment of responsibility for generation of meeting minutes of all project meetings.
  12. Project Close-Out requirements and procedures.

13. Project records.
  14. Requirements for the Contractor to furnish the Owner a list of hazardous materials that may be brought onto the job site, and 48- hour notification requirement.
- c. **Monthly Pay Meeting:** Section 36 establishes the requirement for a monthly pay meeting which will usually be held at or near the Site. In addition to Owner, A/E and Contractor representatives, the following representatives, at a minimum, should be available to attend portions of the meeting, as applicable or necessary:
- Owner's Project Inspector
  - Contractor's project superintendent
  - A/E representative of each discipline where Work was performed for the current pay request or where Work is projected to be performed in the coming month.
  - A representative of each subcontractor who performed work included in the current pay request.
  - A representative of each subcontractor who is projected to perform work in the coming month.

The following topics should be included, as a minimum, in the monthly pay meeting:

1. Observations of status, quality and workmanship of Work in progress
  2. Validation of the Schedule of Values and Certificate for payment
  3. Status of progress of the Work and conformance with proposed construction schedule and recovery schedule, if any
  4. Outstanding Requests for Information, Requests for Clarification and Requests for Proposal
  5. Submittals with action pending
  6. Status of pending Change Orders
  7. Status of Running Punch List items
  8. Work proposed for coming pay period
  9. Discussions of any problems or potential problems which need attention
- d. **Other Meetings:** Requirements for other meetings, such as progress meetings, coordination meetings, pre-installation meetings and/or partnering meetings, may be included in the Contract Documents.

## 51. SMALL BUSINESS PROCUREMENT PLAN

If the Total Contract Amount of the Contract is greater than \$10,000 and the Contractor is a SWaM/SDV Business; then the Contractor shall include a Small Business Procurement Plan in its Bid (if subcontracting work is intended by the Contract as part of its performance of the Work).

If the Total Contract Amount of the Contract is greater than \$100,000, then the Contractor shall include in its Bid a Small Business Procurement Plan and report on the involvement of SWaM/SDV Businesses in the Contractor's performance of the Contract as follows:

1. **Periodic Progress Reports:** The Contractor shall report on involvement of SWaM/SDV Business with each periodic invoice submitted by the Contractor. The report shall identify each subcontract or agreement with a SWaM/SDV Business, including the total contract value, and state the total amounts paid to each SWaM/SDV Business in connection with the Contract as of the report date. The report shall provide this information separately for each type of SWaM/SDV Business and shall clearly indicate those SWaM/SDV Businesses which were identified in the Contractor's Small Business Procurement Plan submitted by the Contractor in the procurement phase for the Contract. The Contractor shall provide two (2) copies of each periodic report to the Owner. Failure to submit the report with each invoice will result in the invoice being rejected by the Owner without payment.
  
2. **Final Compliance Report:** Prior to or with its final invoice for payment, the Contractor shall certify and report on its compliance with the Small Business Procurement Plan, submitted by the Contractor in its Bid for the Contract, to the Owner through DGS' eVA system. In the Final Compliance Report, the Contractor shall:
  - Provide a written explanation to the Owner of any variances between the Contractor's Small Business Procurement Plan and the actual participation of SWaM/SDV Businesses in the Contractor's performance of the Contract; and
  - Report on the involvement of other SWaM/SDV Businesses in the Contractor's performance of the Contract, including the contract value, the type of SWaM/SDV Business, a comparison of the actual amount paid with the planned amounts, the total amount paid to each type of SWaM/SDV Business, and a calculation of the percentage of the Total Contract Amount paid to SWaM/SDV Business.

A format for the Final Compliance Report will be provided by the Owner.

The Owner may withhold final payment to the Contractor until the Contractor has complied with the requirements of its Small Business Procurement Plan submitted by the Contractor in the procurement phase for the Contract.

\* \* \* E N D O F G E N E R A L C O N D I T I O N S \* \* \*

**SUPPLEMENTAL GENERAL CONDITIONS**

The Commonwealth of Virginia General Conditions of the Construction Contract, Form DGS-30-054 (CO-7), are modified and supplemented as hereinafter described.

1. Section 43, DAMAGES FOR DELAY, EXTENSION OF TIME, shall be supplemented by adding the following paragraphs:

**Agreed Compensation/Liquidated Damages for Contractor Delay:**

- (h) The Contractor acknowledges and agrees that its failure to achieve the dates established by the Contract for Substantial Completion and/or Final Completion will cause the Owner to incur substantial economic damages and losses of types and in amounts which are impossible to quantify with certainty. The Contractor and Owner agree that liquidated damages may be assessed and recovered by Owner from Contractor and Surety and that the liquidated damages set forth below represent a fair, reasonable and appropriate measure of the Owner's damages in the event of a delay and that such damages are not a penalty.
- (i) In addition to liquidated damages for delay, the Contractor also shall be liable to Owner for any and all other damages sustained by the Owner as a result of any other breach of the Contract by Contractor, including, but not limited to, costs incurred by Owner to complete the Work or remedy Defective Work.
- (j) If the Contractor does not achieve Substantial Completion of the Work by the Contract Completion Date, the Contractor shall pay to the Owner liquidated damages in the amount of **\$932.00** per Day for each and every partial or full Day of delay in Substantial Completion (the "Step One Liquidated Damages").
- (k) When the Contractor achieves Substantial Completion, the accrual of Step One Liquidated Damages shall cease and the Contractor shall have thirty (30) Days in which to achieve Final Completion of the Work.
- (l) If Final Completion of the Work is not achieved on or before the thirtieth (30th) Day after Substantial Completion, and if the Owner has not granted any extension of time for Final Completion, the Contractor shall pay to the Owner liquidated damages in the amount of **\$673.00** for each and every partial or full Day of delay in Final Completion ("Step Two Liquidated Damages").
- (m) The Contractor waives any and all challenges and defenses as to the validity, reasonableness or enforceability of the Step One Liquidated Damages and Step Two Liquidated Damages, including any claim that the liquidated damages are void as penalties or are not reasonably related to actual damages.

## Small Business Subcontracting Plan

It is the goal of the Commonwealth that over 50% of its purchases be made from small businesses. All potential bidders are required to submit the subcontractor plan by one of the following methods in order to be considered responsive:

- A. Complete the subcontractor plan as specified in the electronic response; or
- B. Download the “paper response” form, complete the subcontractor plan section, and submit it as an attachment with the bid response.

**Small Business:** "Small business (including micro)" means a business that holds a certification as such by the Virginia Department of Small Business and Supplier Diversity (DSBSD) on the due date for bids. This shall also include DSBSD certified women-owned and minority-owned businesses and businesses with DSBSD service-disabled veteran-owned status when they also hold a DSBSD certification as a small business on the bid due date. Currently, DSBSD offers small business certification and micro-business designation to firms that qualify.

Certification applications are available through DSBSD online at [www.SBSD.virginia.gov](http://www.SBSD.virginia.gov) (Customer Service).

Bidder Name: \_\_\_\_\_

Preparer Name: \_\_\_\_\_ Date: \_\_\_\_\_

Who will be doing the work:  I plan to use subcontractor(s)  I plan to complete all work

### Instructions

- A. If you are certified by the DSBSD as a micro/small business, complete only Section A of this form.
- B. If you are not a DSBSD-certified small business, complete Section B of this form. For the bid to be considered and the bidder to be declared responsive, the bidder shall identify the portions of the contract that will be subcontracted to DSBSD certified small businesses for the initial contract period in relation to the bidder’s total price for the initial contract period in Section B.

### Section A

If your firm is certified by the DSBSD provide your certification number and the date of certification.

Certification number: \_\_\_\_\_ Certification Date: \_\_\_\_\_

### Section B

If the “I plan to use subcontractors box is checked,” populate the requested information below, per subcontractor to show your firm's plans for utilization of DSBSD-certified small businesses in the performance of this contract for the initial contract period in relation to the bidder’s total price for the initial contract period. Certified small businesses include but are not limited to DSBSD-certified women-owned and minority-owned businesses and businesses with DSBSD service-disabled veteran-owned status that has also received the DSBSD small business certification. Include plans to utilize small businesses as part of joint ventures, partnerships, subcontractors, suppliers, etc. It is important to note that this proposed participation will be incorporated into the subsequent contract and will be a requirement of the contract. Failure to obtain the proposed participation dollar value or percentages may result in a breach of the contract.

**B. Plans for Utilization of DSBSD-Certified Small Businesses for this Procurement**

**Subcontract #1**

Company Name: \_\_\_\_\_ SBSD Cert #: \_\_\_\_\_  
Contact Name: \_\_\_\_\_ SBSD Certification: \_\_\_\_\_  
Contact Phone: \_\_\_\_\_ Contact Email: \_\_\_\_\_  
Value % or \$ (Initial Term): \_\_\_\_\_ Contact Address: \_\_\_\_\_  
Description of Work: \_\_\_\_\_

**Subcontract #2**

Company Name: \_\_\_\_\_ SBSD Cert #: \_\_\_\_\_  
Contact Name: \_\_\_\_\_ SBSD Certification: \_\_\_\_\_  
Contact Phone: \_\_\_\_\_ Contact Email: \_\_\_\_\_  
Value % or \$ (Initial Term): \_\_\_\_\_ Contact Address: \_\_\_\_\_  
Description of Work: \_\_\_\_\_

**Subcontract #3**

Company Name: \_\_\_\_\_ SBSD Cert #: \_\_\_\_\_  
Contact Name: \_\_\_\_\_ SBSD Certification: \_\_\_\_\_  
Contact Phone: \_\_\_\_\_ Contact Email: \_\_\_\_\_  
Value % or \$ (Initial Term): \_\_\_\_\_ Contact Address: \_\_\_\_\_  
Description of Work: \_\_\_\_\_

**Subcontract #4**

Company Name: \_\_\_\_\_ SBSD Cert #: \_\_\_\_\_  
Contact Name: \_\_\_\_\_ SBSD Certification: \_\_\_\_\_  
Contact Phone: \_\_\_\_\_ Contact Email: \_\_\_\_\_  
Value % or \$ (Initial Term): \_\_\_\_\_ Contact Address: \_\_\_\_\_  
Description of Work: \_\_\_\_\_

**Subcontract #5**

Company Name: \_\_\_\_\_ SBSD Cert #: \_\_\_\_\_  
Contact Name: \_\_\_\_\_ SBSD Certification: \_\_\_\_\_  
Contact Phone: \_\_\_\_\_ Contact Email: \_\_\_\_\_  
Value % or \$ (Initial Term): \_\_\_\_\_ Contact Address: \_\_\_\_\_  
Description of Work: \_\_\_\_\_

**Subcontract #6**

Company Name: \_\_\_\_\_ SBSD Cert #: \_\_\_\_\_  
Contact Name: \_\_\_\_\_ SBSD Certification: \_\_\_\_\_  
Contact Phone: \_\_\_\_\_ Contact Email: \_\_\_\_\_  
Value % or \$ (Initial Term): \_\_\_\_\_ Contact Address: \_\_\_\_\_  
Description of Work: \_\_\_\_\_



**CAPITAL OUTLAY  
VENDOR QUALIFICATION CERTIFICATION FORM**

**All bidders responding to this IFB should complete and return all requested information applicable to performing the work. Place N/A beside all questions that do not apply. This form must be provided to the Contract Officer within 2 business days of request if not returned with the bid or the bidder may be deemed non-responsive.**

- 1. Name of Business: \_\_\_\_\_
- 2. Name of Owner or Chief Executive Officer: \_\_\_\_\_ Telephone Number: \_\_\_\_\_
- 3. How many persons are currently employed by the firm? \_\_\_\_\_
- 4. List all current projects and the value of the project that is being performed by your firm. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Is the firm currently removed from a vendor list or debarred/enjoined from doing business with any Commonwealth of Virginia Agency?  
Yes \_\_\_\_\_ No \_\_\_\_\_ If yes explain: \_\_\_\_\_  
\_\_\_\_\_

6. Provide the firm name, contact person, email address and telephone / fax numbers of three (3) customers, for which your firm has provided services of the same/similar scope as those requested in this inquiry. We may contact these customers as references.

FIRM'S NAME	CONTACT PERSON	EMAIL ADDRESS	TELEPHONE / FAX #

7. Identify any VDOT locations for which your firm is currently working, the contract number associated with the work and the location where the work is being performed.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **Security and Identification Requirements for all Contractors and Employees of Contractors**

The Virginia Department of Transportation (VDOT) reserves the right to later conduct a background check as part of the VDOT Security Clearance process on the Contractor's employees and on the Subcontractor employees. All employees of the Contractor and of Subcontractors shall have VDOT-approved identification passes while working at VDOT facilities. An identification pass is defined as a VDOT-issued Visitor Pass, a Contractor-issued photo-identification badge, or a VDOT-issued photo-identification badge. A Contractor-issued photo-identification badge is a form of identification that can be provided by either the Contractor or the Subcontractors to their own employees. The VDOT facilities are defined as all buildings, and the real (non-roadway) property owned or rented by VDOT.

### **Contractor-Issued Photo-Identification Badges:**

- A. The Contractor and Subcontractor shall provide photo-identification badges for each employee requiring access to the VDOT facility. The Contractor-issued photo-identification badge must contain the employee's legal and common name, a clear photograph of the employee and contain the employee's company's name or logo. Photographs must be clear, front view, full face, and without dark glasses or hat.
- B. The Contractor shall provide a list of all Contractor employees and Subcontractor employees who will perform work at the VDOT facility to the VDOT Project Manager prior to starting work at the VDOT facility.
- C. VDOT shall issue a standard VDOT Visitor Badge to each employee of the Contractor and Subcontractor who require access to the VDOT facility. Each standard-VDOT Visitor Badge contains an identification number that shall be assigned to a specific employee.
- D. The Contractor's employees and Subcontractor's employees shall wear their Contractor-issued photo-identification badges and their standard VDOT Visitor Badge at or above chest level on the outermost garment of the employee, unless doing so interferes with safe working conditions. In such instances, the Contractor's employees and Subcontractors shall have the Contractor-issued photo-identification badges and standard VDOT Visitor Badges on their person for ready display.
- E. Contractor-issued photo-identification badges and standard VDOT Visitor Badges shall be kept in the custody of the Contractor's employees and Subcontractor's employees. It will be the responsibility of the Contractor to assure that the Contractor-issued photo-identification badge and standard VDOT Visitor Badge are present on each employee when working at the VDOT facility. The Contractor shall return each standard VDOT Visitor Badge to VDOT when an individual's employment is terminated and shall return all standard VDOT Visitor Badges to VDOT at the expiration of the contract. The Contractor shall notify VDOT immediately if any standard VDOT Visitor Badges are lost, stolen or destroyed and shall immediately return any damaged standard VDOT Visitor Badges.
- F. Standard VDOT Visitor Badges shall only be worn while conducting official VDOT business.
- G. The Contractor and VDOT will perform audits of all badges to assure accuracy of all information provided and employment of the person holding the badge.
- H. The contract shall not be considered complete until the Contractor returns all standard VDOT Visitor Badges. VDOT shall withhold the contract retainage until all standard VDOT Visitor Badges are returned. VDOT shall charge the Contractor \$5 for each missing standard VDOT Visitor Badges.



**FORM G-2**

**CONTRACTOR'S ROOFING SYSTEM(S) GUARANTEE**

This \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_,

\_\_\_\_\_  
\_\_\_\_\_  
(insert name and address of Contractor)

hereinafter called the "Contractor" hereby guarantees the materials and workmanship associated with the roofing, flashings, and sheet metal work incidental to the total roofing systems of the Office Building Area Headquarters Buchanan.

hereinafter called the "Project", against leaks and any other defects due to faulty materials or workmanship for a period of two (2) years after the date of written acceptance by the Owner. The Contractor shall, throughout a period of two (2) years from the date of acceptance and at no cost to the Owner, maintain the entire roof system(s) in a completely watertight condition. The guarantee shall also cover without limitation the roofing membrane and flashing, metal flashing, parapet coping, (where specified), and penetrations of the roofing membrane including plumbing stacks, ventilator and mechanical equipment curbs, roof hatches, and expansion joints, (where installed.) If it can be proven by the Contractor that the Owner caused the damage, the terms of this guarantee shall not be enforced.

This date of acceptance, established at final inspection, is \_\_\_\_\_

The guarantee expires on \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
(Contractor)

\_\_\_\_\_  
\_\_\_\_\_  
(Business Address)

\_\_\_\_\_  
\_\_\_\_\_  
(Business Phone #)

\_\_\_\_\_  
\_\_\_\_\_  
(Home Phone #)

\_\_\_\_\_  
\_\_\_\_\_  
(Signature)

## ROOFING SUBCONTRACTOR'S GUARANTEE

The roofing contractor hereby guarantees the materials and workmanship associated with the roofing, flashings, and sheet metal work incidental to the work required under the roofing subcontract, against defect due to faulty materials or workmanship for a period of two (2) years from the date of acceptance of the Project as established above. It is understood and agreed by all parties hereto that the responsibility of the roofing contractor under this guarantee form or any contract document shall be limited to the limited guarantee herein expressed by said roofing subcontractor.

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(Roofing Subcontractor, where applicable)

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(Business Address)

---

(Business Phone #)

---

(Signature)

## OWNER'S AGREEMENT

The undersigned named Owner for the Commonwealth of Virginia agrees, from the date of acceptance of the Project as established above, to maintain the roofs in accordance with the manufacturer's written requirements provided to the Owner and agrees to avoid damage to the roof surface by any parties under his control working or walking on the roof. The Owner recognizes his responsibility to inspect each roof semi-annually.

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(Owner)

---

(Signature)

---

(Typed Name and Official Title)

## LIST OF DRAWINGS

<u>Sheet No.</u>	<u>Title</u>
	Cover Sheet
C-1	Existing Layout and Demolition Plan
C-2	Layout and Grading Plan
C-3	Erosion & Sediment Control Plan
C-4	Erosion & Sediment Control Minimum Standards and Septic Notes & Details
C-5	Details
C-6	General Notes
SW-1	VDOT SWPP Plan
SW-2	VDOT SWPP Plan
SW-3	VDOT SWPP Plan
SW-4	VDOT SWPP Plan
B-1	Soil Borings
D1-1	Demolition Plan – Timekeeper Office – Building #2160228
A1-1	Floor Plans, Roof Plan, Porch Plan, Toilet Plan, & Toilet Elevations
A2-1	Door, Window, Finish Schedule & Details
A3-1	Elevations & Building Sections
A4-1	Wall Sections & Interior Details
A5-1	Reflected Ceiling Plan & Details
S-1	General Structural Notes, Schedules & Typ. Sect.
S-2	Foundation and Roof Framing Plan
S-3	Sections
M1-1	Floor Plan - Mechanical
M2-1	Notes & Schedules – Mechanical
P1-1	Floor Plans – Plumbing
P2-1	Notes, Details & Schedules - Plumbing
E1-1	Lighting Floor Plan
E1-2	Power Floor Plan
E1-3	One Line Diagram & Panel Schedules
E1-4	Site Lighting and Electric Vehicle Charging Station Plan
E0-1	Egress Photometric Plan

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **SECTION 01000**

#### **SUMMARY OF WORK**

#### **PART 1 GENERAL**

##### **1.1 GENERAL DESCRIPTION**

- A. The work generally consists of construction of approximately 1,620 SF constructed of metal studs with masonry and fiber cement board facing. Roofs consist of a prefabricated wood truss with shingles. Site work includes a septic system, a new domestic water service line, underground electrical service, emergency generator, paving and ADA parking spaces. Veedor-Root control box relocated to the new building.
- B. Location:
  - 1. New London Area Headquarters PC: 501-18041-021  
5507 Thomas Jefferson Road  
Forest, Virginia 24551
- C. This brief description, however, shall not in any way be construed to limit the Contractor's obligation for compliance with the Contract Documents.
- D. No asbestos containing materials shall be used on the project.

##### **1.2 PROCEDURES FOR COMMENCING THE WORK**

- A. The Owner will submit to the Contractor the Notice to Proceed shortly after execution of the Contract, at which the construction start time will be stipulated and the date of completion of the project will be stated.

##### **1.3 MANNER OF CONDUCTING THE WORK**

- A. Regularly clean up the work and, at all times, maintain the project in as neat and orderly a manner as is consistent with normal operation. Accomplish the work and furnish such temporary facilities, as to preclude interference with access to the existing site and to cause no possible interference with the operation of any essential service thereof.
- B. Do not operate or disturb the setting of valves, switches, or electrical equipment on the service lines to any VDOT building except by proper previous arrangement with the Owner.
- C. Coordinate demolition and installation of temporary and permanent utilities with the Owner, causing no disruption of existing building operations and minimum delay of the work. Notify the Owner a minimum of one week in

advance of anticipated utility outages. Such work shall be scheduled at the Owner's convenience.

- D. Existing work, including concealed work not indicated or specified to be modified, and which is damaged or otherwise affected by the Contractor's operations, shall be restored to a condition as good as existed before the Work was commenced. Where new construction adjoins, connects to, or abuts existing Work, the junction shall be made in a substantial, workmanlike manner. Join new Work to existing work in such a manner as to make the joining as inconspicuous as possible. At the completion, the buildings and grounds shall be in first class condition within the intent of these specifications, with all new parts well joined to the old as required, all connections completed, and all facilities in full working condition.

#### **1.4 VDOT EQUIPMENT AND MATERIALS**

- A. No VDOT equipment or materials may be used by the Contractor for the construction of this project.

#### **1.5 SECURITY**

- A. All Contractor personnel shall be equipped with photo identification cards, worn at all times while at the construction site. Identification cards shall be supplied at Contractor's expense.

#### **1.6 TIME FOR COMPLETION**

- A. The entire work, including all the requirements of Section 01700 "Project Closeout," shall be substantially completed in 180 consecutive calendar days. Schedules will be reviewed at each monthly pay request. If critical path is behind schedule, Contractor shall recommend strategies to recover lost time.

### **PART 2 PRODUCTS**

Not Used

### **PART 3 EXECUTION**

Not Used

END OF SECTION

## SECTION 01300

### SUBMITTALS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Submittals include shop drawings, product data, and samples as defined in the General Conditions and also include certificates, test data, schedules, and other submittals required to demonstrate compliance with the Contract Documents.

##### 1.2 CONTRACTOR PREPARATION

- A. Review and coordinate submittals with all other related or affected work before they are submitted to the Architect, and all copies shall bear the Contractor's certification that he has checked and approved them. Certification shall include wording as stated in the General Conditions, Article 24 Submittals. By approving the submittals, the Contractor thereby represents that he has determined and verified applicable field measurements, field construction criteria, materials, catalog numbers and similar data, and has checked and coordinated each shop drawing and sample with the requirements of the work and the Contract Documents. Submittals submitted without such certification and coordination will be returned to the Contractor rejected, and will be considered not a formal submission. Delays in construction because of late submission or resubmission of submittals requested by the Architect are the Contractor's responsibility.
- B. If submittals deviate from the drawings and specifications because of standard shop practice or any other reason, make specific mention of such deviation in the letter of transmittal in order that, if acceptable, suitable action may be based on the stated deviation. Otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the drawings and specifications even though such submittals have been accepted.
- C. Where an item is part of an assembly and must be fully coordinated with that assembly, submit the entire assembly together in order that proper evaluation of the submittals may be made. Indication that the items have not been coordinated shall show cause for rejection of the entire group until such coordination has been made. The Architect's acceptance of a separate item shall not indicate acceptance of an assembly in which the item functions.

##### 1.3 FORM OF SUBMITTAL

- A. Each submission shall be accompanied by a letter of transmittal in duplicate, listing the contents of the submissions and identifying each item by reference to specification or drawing. Clearly label shop drawings with the name of the project,

the Project Code (501-18041-021) and other necessary information. Product data and other similar material that cannot be so labeled conveniently, shall be bound in suitable covers bearing the identifying data.

- B. Submit shop drawings in the form of 1 reproducible print and 5 black or blueline prints. After review, the Architect will return the reproducible print with any applicable notations and an appropriate stamp. If corrections are to be made, revise the original drawings and submit a new reproducible and two prints, and so repeat until accepted. Leave a minimum clear space, 2-1/2 inches by 2-1/2 inches, on the reproducible print above or to the left of the title block for application of the Architect's review stamp. The Contractor shall be responsible for the prints required for the work, and these prints shall be from the final reproducible bearing the final stamp of the Architect.
- C. Clearly mark product data to identify the applicable products or models. Identify where options or modifications are required by the Contract Documents. Submit product data and other non-reproducible literature, except certificates, in the number of copies required by the Contractor, plus 3 to be retained by the Architect.
- D. In lieu of submitting hard paper copies, Contractor may submit an electronic copy in PDF format. In the electronic heading, identify the section and item submitted. A stamped PDF copy will be returned electronically.
- E. If certificates certify the performance or quality of materials or products, submit with other submittals. Submit certificates certifying the method of installation or quality of installation at the completion of the work. Provide 2 copies to be retained by the Architect, plus additional copies as required by the Contractor.
- F. Samples: Samples shall be of sufficient size and quantity to illustrate clearly the functional characteristics of the product with integrally related parts and attachment devices and shall be the standard by which the finished work will be evaluated. Furnish one sample for each required submittal unless otherwise specified in the technical specifications. In general, samples shall be delivered to the office of the Architect unless the Architect requests delivery to the Owner at the building site. Full size usable samples will be returned to the Contractor and accepted samples may be used as part of the work unless otherwise specified.

#### **1.4 RESUBMISSION**

- A. Change or correct submittals as required by the Architect and resubmit until accepted. Also indicate any changes which have been made other than those requested by the Architect.

#### **1.5 ARCHITECT PROCEDURES**

- A. Submittals will be reviewed with reasonable promptness. In general, allow a minimum of 10 business days for Architect's review and return of submittals. Submittals will be stamped by the Architect with one of the four following actions:

1. "No Exceptions Taken" indicates no exception were taken and the work may proceed. However, the Architect's notation shall not relieve the Contractor from the responsibility of complying with all requirements of this Contract, including the obligation to provide submittals that are accurate and complete. The Owner assumes no responsibility for figured dimensions on shop drawings.
2. "Make Corrections Noted" indicates that Contractor may proceed on the basis of corrections indicated. Resubmission is not required.
3. "Amend & Resubmit" indicates that final fabrication shall not proceed. Corrections shall be made to the submittal and it shall be resubmitted.
4. "Rejected - See Remarks" indicates rejection of the product/drawings or that insufficient product data has been submitted and the Contractor should submit new or revised data for acceptance.

## **1.6 CHANGES AFTER APPROVAL**

- A. Without obtaining the prior written consent of the Architect, make no change in any submittal marked "No Exceptions Taken" or "Make Corrections Noted." If such written consent is obtained, revise the submittal to show fully the altered parts of the work and resubmit according to the procedures specified herein. The resubmitted submittal shall also state that the work shown supersedes and voids work identified on the drawings previously reviewed by the Architect and the date of such action.
- B. No submittal may be used in the shop or on the work except in accordance with the foregoing paragraphs. The ordering or fabrication of materials before approval of all relevant drawings shall be at the Contractor's risk.

## **PART 2 PRODUCTS**

Not Used

## **PART 3 EXECUTION**

Not Used

END OF SECTION



## SECTION 01410

### INSPECTIONS AND TESTS

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Work Included:

1. Perform inspections and testing required of Contractor.
2. Cooperate with Architect, Owner's selected testing agency, and all others responsible for testing and inspecting the Work.

###### B. Work by Owner:

1. Where no testing requirements are specified, but Owner decides that testing is required, Owner may require and pay for such testing, to be performed under current pertinent standards for such testing.

##### 1.2 PAYMENT FOR INSPECTIONS AND TESTS

###### A. Required Inspections and Tests:

1. Inspections and tests indicated to be performed by Owner's testing laboratory will be paid for by Owner.
2. Inspections and tests indicated to be performed by Contractor or his suppliers shall be paid for by Contractor.

###### B. Retesting:

1. When tests paid for by Owner indicate noncompliance with the Contract Documents, subsequent retesting occasioned by the noncompliance shall be performed by same testing agency, and costs thereof will be deducted by Owner from the Contract Sum. Refer to the General Conditions.

###### C. Code Compliance Testing:

1. Inspections and tests other than the special inspections listed at the end of this section, required by codes or ordinances, and which are made by a legally constituted authority, shall be responsibility of and shall be paid for by Contractor, unless otherwise provided in the Contract Documents.

##### 1.3 CONTRACTOR'S QUALITY CONTROL TESTING

- ###### A. Notwithstanding Owner's testing for quality assurance, Contractor is required to provide his own testing in order to control work in a manner which delivers the

quality product specified. Contractor's testing is to control quality, and Owner's testing is to assure conformance to contract requirements.

- B. Inspecting and testing performed exclusively for Contractor's control of quality shall be the sole expense and responsibility of Contractor.

#### **1.4 SPECIAL INSPECTIONS**

- A. Definition: "Special inspections" are those inspections required by Chapter 17 "Structural Tests and Inspections" of the "Virginia Uniform Statewide Building Code (VUSBC)", 2018 edition.
- B. Special inspections applicable to Project and the party(s) responsible for performing special inspections are listed in "Schedule of Special Inspections" at end of this Section.

### **PART 2 PRODUCTS**

Not Used

### **PART 3 EXECUTION**

#### **3.1 INSPECTIONS/TESTING BY CONTRACTOR**

- A. Throughout the Work, provide inspections, tests, certificates, and other data required to be provided by Contractor and his suppliers:
  - 1. As required by other Sections of these Specifications.
  - 2. As necessary to ensure compliance with requirements of the Contract Documents.

#### **3.2 COOPERATION WITH TESTING LABORATORY**

- A. Representatives of Owner's testing laboratory shall have access to Work at all times and at all locations where work is in progress. Provide facilities for such access to enable laboratory to perform its functions properly.
- B. Contractor shall notify Architect at least 48 hours in advance of any inspections required to be performed by testing laboratory or Architect.
  - 1. When permitted by Architect, notify Owner's testing laboratory directly of any inspections required to be performed by laboratory, with copy of notification to Architect.

### **3.3 SCHEDULES FOR TESTING**

#### **A. Establishing Schedule:**

1. By advance discussion with testing laboratory selected by Owner, determine time required for laboratory to perform its tests and to issue each of its findings.
2. Provide all required time within construction schedule.
3. Incorporate into CPM scheduling.

#### **B. Revising Schedule:** When changes of construction schedule are necessary during construction, coordinate all such changes with testing laboratory.

#### **C. Adherence to Schedule:** When testing laboratory is ready to test according to established schedule, but is prevented from testing or taking specimens due to incompleteness of work, all extra charges for testing attributable to delay will be deducted by Owner from the Contract Sum.

### **3.4 SCHEDULE OF SPECIAL INSPECTIONS**

#### **A. Special inspections to be completed by the Owner's inspection agency is attached to the end of this section**

END OF SECTION

DGS-30-048  
(Rev. 07/22)  
2018 Code Version

**STATEMENT OF VUSBC SPECIAL INSPECTIONS &  
STRUCTURAL OBSERVATIONS**  
(STATE OWNED BUILDINGS)

**CO-6a**  
(cover page)

DATE: February 20, 2023

INSTITUTION/AGENCY: **Virginia Department of Transportation**  
PROJECT TITLE: **Office Building at Area Headquarters (New London)**  
PROJECT CODE: **501-18041-021**  
A/E OF RECORD: **Hughes Associates Architects and Engineers**

The following firms and/or individuals (with address and telephone number shown) are designated to perform the Special Inspections required herein. The firm/individual has the experience, qualifications, certifications and/or licenses required to perform the functions indicated.

**OWNER'S TESTING AND INSPECTION SERVICE**

**OWNER'S TEST LAB**

**A/E of RECORD INSPECTION**

**SMOKE CONTROL INSPECTION & TESTING**

Name: <b>TBD - Firm to be listed on the</b>	Name: <b>Hughes Associates Architects &amp; Engine</b>	Name: <b>Not Applicable</b>
Address (St): <b>CO-17 Building Permit</b>	Address (St): <b>656 Elm Ave SW</b>	Address (St):
City, St., Zip:	City, St., Zip: <b>Roanoke, VA 24016</b>	City, St., Zip:
Phone:	Phone: <b>(540) 342-4002</b>	Phone:

**OWNER'S PROJECT INSPECTOR**

**OWNER'S PROJECT MANAGER**

**OWNER'S STRUCTURAL OBSERVER**

Name: <b>Mikel "Mike" O'Malley</b>	Name: <b>John Dyer</b>	Name: <b>Not Applicable</b>
Phone: <b>(540) 944-8141</b>	Phone: <b>(804) 382-3861</b>	Phone:

Inspection and/or Testing responsibilities are indicated on the attached List of Special Inspections, Form CO-6b. Copies of all test data and reports shall be provided to the Architect/Engineer of Record and to the Owner's Project Manager on a timely basis. The Contractor shall be notified of all deficiencies and discrepancies in a timely manner so that corrective action can be taken.

**PROFESSIONAL OVERSIGHT AND CERTIFICATION**

**STRUCTURAL ENGINEER OF RECORD**

**A/E of RECORD**

**SMOKE CONTROL RDP**

Name: <b>Day &amp; Kinder Consulting Engineers</b>	Name: <b>Hughes Associates Architects &amp; Engine</b>	Name: <b>Not Applicable</b>
Address (St): <b>3959 Electric Road Suite 348</b>	Address (St): <b>656 Elm Ave SW</b>	Address (St):
City, St., Zip: <b>Roanoke, VA 24018</b>	City, St., Zip: <b>Roanoke, VA 24016</b>	City, St., Zip:
Phone: <b>540-774-5706</b>	Phone: <b>(540) 342-4002</b>	Phone:
<i>[Signature]</i> <b>2/20/2023</b> (Signature) (Date)	<i>[Signature]</i> <b>2/20/2023</b> (Signature) (Date)	<i>[Signature]</i> (Signature) (Date)

**AGENCY REQUEST FOR APPROVAL**

Submitting Agency: **VDOT**  
Representative's Name: **John Dyer**  
Phone: **(804) 382-3861**  
Email: **john.dyer@vdot.virginia.gov**

*[Signature]* **3/07/2023**  
(Signature) (Date)

**CODE OFFICIAL'S ACCEPTANCE**

- Acceptable as submitted
- Acceptable as marked

By: *[Signature]* **7/5/2023**  
For or By Director (Date)  
Division of Engineering & Buildings

DGS-30-052

**2018 VUSBC SPECIAL INSPECTIONS & STRUCTURAL OBSERVATIONS**

CO-6b

(Rev. 07/22)

(STATE OWNED BUILDINGS)

2018 Code Version

Project Code: 501-18041-021

Project Title: Office Building at Area Headquarters (New London)

MATERIAL/ ACTIVITY	TYPE OF INSPECTION (A/E add lines as needed to identify other required items)	THIS PROJ ?	REFERENCE	INSPECTION / TEST BY *				
				OWNER'S TEST LAB	A/E OF RECORD	SMOKE CONTROL	PROJECT INSPECTOR	CONTRACTOR / SUPPLIER
<b>FOUNDATIONS</b>								
Soil	Classify & Test Existing Soils & Fill Materials	X	Specs, 1705.6	X (Spot)				
Soil	Compaction Of Fill Materials	X	Specs, 1705.6	X				
Soil	Bearing At Bottom Of Footing Excavations	X	Specs, 1705.6	X (Spot)				
Piles	Driving Records, Tip & Cutoff Elevations		1705.7, 1705.9	X	4			
Piles	Load Test		1705.7	X	4			
Caissons	Drilling, Size, Bearing Conditions, Materials		1705.8, 1705.3	X				
<b>CONCRETE CONSTRUCTION</b>								
Concrete	Ready-Mix Plant Quality Control	X	Specs, 1704.2.5		2			X, 1
Concrete	Mix Design Tests And Certificates	X	Specs, 1705.3		X			X, 1
Reinf. Steel	Shop Drawings Of Reinforcing Steel	X	Specs		X			
Reinf. Steel	Placement Of Reinforcing Steel	X	1705.3	X (Spot)	X (Spot)		X	
Reinf. Steel	Welding		1705.3.1	X (Spot)	2			X,1
Reinf. Steel	Special Construction		1704.5.7		2			
Formwork	Shape, Location, Dimensions	X	1705.3	X (Spot)			X	X
Formwork	Removal and Reshoring	X	1705.3	X (Spot)				
Concrete	Test Cylinders & Strength Test	X	1705.3, 1910.10	X	4			
Concrete	Mix Proportions & Mix On Delivery Tickets	X	1705.3				X (Spot)	
Concrete	Slump Test	X	1705.3	X	4		X	
Concrete	Placement Procedures	X	1705.3	X	X (Spot)		X (Spot)	
Concrete	Curing Temperatures & Techniques	X	1705.3	X			X	
Prestressed	Prestressing Procedures & Forces		1705.3	X	2			X,1
Prestressed	Shop Drawings Of Prestressed Units		Specs		X			
Precast	Quality Control Of Manufacturer		1704.2.5		2			X, 1
Precast	Shop Drawings Of Precast		Specs		X			
Precast	Erection Of Precast		1705.3	X (Spot)	X (Spot)		X	X
Precast	Inspection Of Connections		1705.3	X (Spot)				
Shotcrete	Reinforcing Steel-Test Panel		1908.5, 1705.3	X	4			
Anchors	Anchors In Concrete		Specs, 1705.3, 1901.3	X				

\* The numbers listed refer to notes on Page 5.

DGS-30-052

**2018 VUSBC SPECIAL INSPECTIONS & STRUCTURAL OBSERVATIONS**

CO-6b

(Rev. 07/22)

(STATE OWNED BUILDINGS)

2018 Code Version

Project Code: 501-18041-021

Project Title: Office Building at Area Headquarters (New London)

MATERIAL/ ACTIVITY	TYPE OF INSPECTION (A/E add lines as needed to identify other required items)	THIS PROJ ?	REFERENCE	INSPECTION / TEST BY *				
				OWNER'S TEST LAB	A/E OF RECORD	SMOKE CONTROL	PROJECT INSPECTOR	CONTRACTOR / SUPPLIER
<b>MASONRY CONSTRUCTION</b>								
Quality Assurance	Indicate Quality Assurance Level (1, 2 or 3)	X	TMS 402, 3.1		X			
Clay Masonry	Certificates, Tests & Technical Data		TMS 602, Table 3	X (Spot)	X			3
Concrete Masonry	Certificates, Tests & Technical Data	X	TMS 602, Table 3	X (Spot)	X			3
Reinf. Steel	Shop Drawings		Specs		X			
Reinf. Steel	Size, Grade, Type, Location, Spacing Of Reinf Steel	X	TMS 602, Table 3, 4	X (Spot)				
Anchors	Manufacturer's Data	X	TMS 602, Table 3, 4	X (Spot)	X			3
Accessories	Manufacturer's Data		Specs		X			3
Mortar & Grout	Mix Design And Data		Specs		X			3
Mortar & Grout	Field Samples and Testing, Placement		TMS 602, Table 3, 4	X (Spot)	4			
Masonry Strength	Masonry Strength Verified		TMS 602, Table 3	X	2, 4			
Masonry	Placement Of Units, Mortar & Accessories	X	TMS 602, Table 4	X (Spot)				
Masonry	Protection Of Masonry Work	X	TMS 602, Table 4	X (Spot)				
Anchorage	Placement Of Devices	X	TMS 602, Table 4	X (Spot)				
Risk Cat. IV	A/E Shall edit list as required by TMS 402		TMS 602, Table 3, 4		X			
<b>STEEL CONSTRUCTION</b>								
Fabricator	Quality Control Inspection Of Shop		1704.2.5		2			X, 1
Fasteners	Mfr's Certificate Of Compliance		AISC 360-16		2			3
Struct. Steel	Mfr's Certificate Of Compliance		AISC 360-16		2			3
Weld Mat'l's	Manufacturer's Certificate Of Compliance		AISC 360-16		2			3
Metal Decking	Welding to Supports		1705.2.2	X (Spot)				
Metal Decking	Manufacturer's Certificate Of Compliance		1705.2.2		2			3
Joist	Mfr's Certificate of Compliance		1704.5.5		2			3
Joist	Open Web Steel Joists-End Connections and Bridging		1705.2.3	X (Spot)				
Details	Shop Drawings Review	X	Specs		X			
Erection	Installation Of High-Strength Bolts	X	AISC 360-16	X (Spot)				
Erection	Welding	X	AISC 360-16	X (Spot)				
Erection	Steel Framing And Connections	X	AISC 360-16	X (Spot)	X (Spot)		X	

\* The numbers listed refer to notes on Page 5.

DGS-30-052

**2018 VUSBC SPECIAL INSPECTIONS & STRUCTURAL OBSERVATIONS**

CO-6b

(Rev. 07/22)

(STATE OWNED BUILDINGS)

2018 Code Version

Project Code: 501-18041-021

Project Title: Office Building at Area Headquarters (New London)

MATERIAL/ ACTIVITY	TYPE OF INSPECTION (A/E add lines as needed to identify other required items)	THIS PROJ ?	REFERENCE	INSPECTION / TEST BY *				
				OWNER'S TEST LAB	A/E OF RECORD	SMOKE CONTROL	PROJECT INSPECTOR	CONTRACTOR/ SUPPLIER
<b>SEISMIC FORCE RESISTANCE INSPECTIONS (as required by VUSBC 1705.12)</b>								
( Note: SDC refers to Seismic Design Category. )								
Structural Steel	Welding and Bolting (SDC = B or C or D)		1705.12.1, AISC 341	X (Spot)				
Wood	Field Glueing (SDC = C or D)		1705.12.2	X				
Wood	Fastening Of Seismic Force Resistance System (SDC = C or D)		1705.12.2	X (Spot)			X	
Light Gage Steel	Fastening (SDC = C or D)		1705.12.3	X (Spot)			X	
Light Gage Steel	Special Bolted Moment Frames (SDC = D)		1705.12.9	X (Spot)				
Components	Mechanical & Electrical - Anchorage and Labeling (SDC = C or D)		1705.12.4, 1705.12.6	X (Spot)				
Components	Architectural - Cladding, Veneer, Non-Bearing Walls (SDC = D)		1705.12.5	X (Spot)				
Components	Access Floors (SDC = D)		1705.12.5.1	X (Spot)				
Components	Storage Racks (SDC = D)		1705.12.7	X (Spot)				
<b>SEISMIC RESISTANCE TESTING (as required by VUSBC 1705.13)</b>								
Structural Steel	Steel Systems and Elements		1705.13.1, AISC 341					
Non-Structural	Components-Mfr's Certificate of Compliance		1705.13.2		2			3
Non-Structural	Designated Systems-Certificate of Compliance		1705.13.3		2			3
Structural	Isolation Systems		1705.13.4	X				
<b>WOOD &amp; LIGHT GAGE STEEL CONSTRUCTION</b>								
Fabrication	Quality Control Inspection Of Shop	X	1704.2.5		2			X, 1
Sheathing	Grade Stamp, Thickness & Fastening	X	Specs, 1703.5	X	X (Spot)		X	
Wood	Grade Stamp	X	Specs, 1703.5		X (Spot)		X	
Wood/Light Gage	Diaphragm Fastening Per Code And Drawings	X	1705.2.2, 1705.5.1	X (Spot)	X (Spot)		X	
Trusses	Shop Drawings	X	Specs		X			
Trusses	Truss Placement, Bracing and Fastening & Anchorage	X	Specs, 1705.2.4, 1705.5.2		X (Spot)		X	
Laminates	Shop Drawings		Specs		X			
Laminates	Identification Per Shop Drawings		Specs		X (Spot)		X	

\* The numbers listed refer to notes on Page 5.

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**2018 VUSBC SPECIAL INSPECTIONS & STRUCTURAL OBSERVATIONS**

CO-6b

(Rev. 07/22)

(STATE OWNED BUILDINGS)

2018 Code Version

Project Code: 501-18041-021

Project Title: Office Building at Area Headquarters (New London)

MATERIAL/ ACTIVITY	TYPE OF INSPECTION (A/E add lines as needed to identify other required items)	THIS PROJ ?	REFERENCE	INSPECTION / TEST BY *				
				OWNER'S TEST LAB	A/E OF RECORD	SMOKE CONTROL	PROJECT INSPECTOR	CONTRACTOR / SUPPLIER
<b>FIREPROOFING</b>								
Spray-on	Manufacturer's Data		Specs		X			3
Spray-on	Surface Conditions		1705.14.2	X				
Spray-on	Application		1705.14.3	X				3
Spray-on	Thickness		1705.14.4	X				
Spray-on	Density		1705.14.5	X				
Spray-on	Bond Strength		1705.14.6	X				
Mastic/Intumescent	Fire-Resistant Coatings - Materials, Application		1705.15	X	X (Spot)		X	3
GWB Fireproof	Manufacturer's Data		Specs		X			3
GWB Fireproof	Placement Of Materials		Specs		X (Spot)		X	
Fire Wall Assembly	Manufacturer's Data		Specs, 706.2		X			3
Fire Wall Assembly	Placement Of Materials		Specs, 706.2		X (Spot)		X	
<b>EXTERIOR INSULATION &amp; FINISH SYSTEMS (EIFS)</b>								
Materials	Manufacturer's Data		Specs		X			3
Preparation	Condition Of Sheathing Substrate		Specs, 1705.16.1		X (Spot)		X	
Application	Methods, Proportions & Thickness Of Installation		Specs, 1705.16.1	X (Spot)	X (Spot)		X	
<b>SMOKE CONTROL ( see note 5 )</b>								
Ducts	Device Location And Air Duct Leakage		1705.18.1			X		
System	Pressure Difference, Flow Measurements & Detection Testing		1705.18.1			X		
Controls	Activation Sequence		1705.18.1			X		
<b>STRUCTURAL OBSERVATIONS ( see note 7 )</b>								
Struct. Observations	As determined in written statement by structural observer		Specs, 1704.6					

\* The numbers listed refer to notes on Page 5.



**DGS-30-052****2018 VUSBC SPECIAL INSPECTIONS & STRUCTURAL OBSERVATIONS****CO-6b**

(Rev. 07/22)

(STATE OWNED BUILDINGS)

2018 Code Version

Project Code: 501-18041-021

Project Title: Office Building at Area Headquarters (New London)

MATERIAL/ ACTIVITY	TYPE OF INSPECTION (A/E add lines as needed to identify other required items)	THIS PROJ ?	REFERENCE	INSPECTION / TEST BY *				
				OWNER'S TEST LAB	A/E OF RECORD	SMOKE CONTROL	PROJECT INSPECTOR	CONTRACTOR / SUPPLIER

**NOTES:**

1. Fabricator, supplier, ready-mixed plant or other production plant shall provide certificates from an approved independent inspection, testing or quality assurance agency attesting that the plant meets at least one of the following criteria:
  - a. The plant is a certified production plant meeting the quality assurance standards of a recognized national standards organization for that product.
  - b. The plant maintains an agreement with an independent inspection or quality assurance agency to conduct periodic in-plant quality assurance inspections. The frequency of these inspections shall not be less than one every six months.
  - c. The plant has an in-shop quality assurance inspection program by an independent testing or quality assurance agency for the work/product to be provided on this project.
2. A/E shall review fabricator/supplier/producer certificates for conformance with appropriate standards of practice and quality assurance.
3. Contractor/supplier shall submit manufacturer's certificates of compliance for the materials/products.
4. Reviews records and test results for conformance with requirements.
5. Special Inspection firm shall have expertise in fire protection engineering, mechanical engineering, and certification as an air balancer. The special inspector listed on the cover page and the Agency are responsible for verifying that the inspector (s) for smoke control is qualified as required by VUSBC 1705.18.2.
6. Unless noted otherwise, the reference numbers listed refer to the 2018 VUSBC.
7. The Owner's structural observer shall submit a written statement to DEB identifying the frequency and extent of structural observations as required by VUSBC 1704.6.

\* The numbers listed refer to notes on Page 5.

**SECTION 01500**  
**TEMPORARY FACILITIES**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Furnish, install, and maintain temporary utilities, and other temporary installations required for construction and remove such facilities on completion.

**1.2 FIELD OFFICES AND SHEDS**

- A. Contractor's Facilities:
  - 1. Provide a field office building, trailer or shed adequate in size and accommodation for Contractor's offices, supply, and storage. Provide space for contractor team meetings and pay request meetings.
  - 2. Office shall be heated and air conditioned.
- B. Locate field office in area designated by Owner.

**1.3 USE OF EXISTING FACILITIES**

- A. A small portion of existing site may be used for storage and other construction requirements. Coordinate locations with the Owner.

**1.4 TEMPORARY ELECTRICITY AND LIGHTING**

- A. Provide connections to existing facilities, size to provide service required for power and lighting; Owner will pay for the costs of the power used.
- B. Install circuit and branch wiring, with area distribution boxes located so that power and lighting are available throughout the construction by the use of construction-type power cords.

**1.5 TEMPORARY WATER**

- A. Water is not available at the site. Contractor shall make arrangements for his water needs.

**1.6 TEMPORARY SANITARY FACILITIES**

- A. Furnish temporary facilities at the construction sites. Provide in accordance with applicable local codes.

## **1.7 REMOVAL**

- A. Completely remove temporary facilities when their use is no longer required. Repair and clean damage caused by temporary installations. Restore permanent facilities used for temporary services to their original condition.

## **PART 2 PRODUCTS**

Not Used

## **PART 3 EXECUTION**

Not Used

END OF SECTION

**SECTION 01700**  
**PROJECT CLOSEOUT**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Provide an orderly and efficient transfer of the completed work to the Owner.

**1.2 DESCRIPTION**

- A. Closeout is hereby defined to include general requirements near the end of the contract time, in preparation for final acceptance, final payment, normal termination of contract, occupancy by the Owner and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in other sections.

**1.3 QUALITY ASSURANCE**

- A. Prior to requesting inspection, the Contractor shall use adequate means to assure that the work is completed in accordance with the specified requirements and is ready for the requested inspection.

**1.4 SUBSTANTIAL COMPLETION**

- A. General: Prior to requesting Architect's inspection for certification of substantial completion, as required by General Conditions (for either the entire work or portions thereof), complete the following and list known exceptions in request:
1. In progress payment request coincident with or first following date claimed, show either 100 percent completion for portion of work claimed "substantially complete," or list incomplete items, value of incompleteness, and reasons for being incomplete.
  2. Submit statement showing accounting of changes to the Contract Sum.
  3. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
  4. Submit record drawings, damage or settlement survey, and similar final record information.
  5. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.
  6. Submit one copy of Operations and Maintenance manuals for review and approval.
  7. Complete final cleaning up requirements.
  8. Touch-up and otherwise repair and restore marred exposed finishes.

- B. After completion of the above-specified prerequisites, submit written notice that the work, or designated portion thereof, is substantially complete and ready for inspection, the Contractor shall, in writing using Form CO-13.2a (Certificate of Substantial Completion), notify the Owner through the Architect at least ten (10) days prior to said date. The Architect/Engineer will affirm through his periodic inspections that a substantial completion inspection is in order and establish a mutually agreeable date and time for the inspection.
- C. Participants in the Substantial Completion inspection shall include representatives of the General Contractor, including subcontractors, the Architect, and the Owner.
- D. The Architect will make an inspection and compile a written list of unfinished work and defective work (punch list) which must be completed or corrected prior to the final inspection. The Architect may require that the Contractor provide a written list of all items not fully completed and/or operational along with his request for substantial completion inspection. Failure to identify unfinished or defective work shall not be construed to relieve the Contractor of his obligation to fully comply with the requirements of the Contract Documents.
- E. The Contractor shall promptly complete all work and correct deficient work including, but not necessarily limited to, the items identified in the punch list.

## **1.5 FINAL INSPECTION**

- A. Prior to the Architect's Final inspection, a non-destruct moisture survey will be conducted by the Owner at his expense. Core drillings will also be made and the Contractor shall make repairs in accordance with warranty requirements. Approval of the survey report shall be the basis for final inspection and closeout.
- B. Upon verification that work is complete the Contractor shall notify the Architect, in writing, that the work is ready for final inspection. The Architect will schedule the final inspection with the Owner, allowing five (5) days notice to all participants.
- C. The Architect will receive the following from the Contractor, review same and turn them over to the Owner at the final inspection.
  - 1. The final Schedule of Values and Certificate of Payment (DGS 30-104 CO-12).
  - 2. Affidavit of Payment of Claims (DGS 30-108 CO-13).
  - 3. Certificate of Completion by the Contractor (DGS 30-136 CO-13.2).
  - 4. List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.
  - 5. Final O & M manuals.
- D. When the Architect concurs that all construction requirements have been met, the Architect will file with the Owner the Certificate of Completion by the Architect/Engineer (DGS 30-112 CO-13.1).

**PART 2 PRODUCTS**

Not Used

**PART 3 EXECUTION**

Not Used

END OF SECTION

## **SECTION 01720**

### **PROJECT RECORD DOCUMENTS**

#### **PART 1 GENERAL**

##### **1.1 DESCRIPTION**

- A. Throughout progress of the work, maintain an accurate record of changes in the Contract Documents, as described in this section and under Paragraph "Plans and Specifications" of the General Conditions.
- B. Upon completion of the work, transfer the recorded changes to a set of As-Built Documents, as described in this section. Cross reference all changes to addenda, change orders, etc.
- C. Additional requirements affecting the As-Built Documents may appear in other sections of these specifications.

##### **1.2 QUALITY ASSURANCE**

- A. Assign the responsibility for maintenance of As-Built Documents to one person on the Contractor's staff as approved by the Owner.
- B. Accuracy of Records:
  - 1. Thoroughly coordinate changes within the As-Built Documents, making adequate and proper entries on each page of the specifications and each sheet of drawings and other documents where such entry is required to show the change properly.
  - 2. Accuracy of records shall be such that a future search for items shown in the Contract Documents may rely reasonably on information obtained from the approved As-Built Documents.
- C. Make entries within 24 hours after receipt of information that the change has occurred.

##### **1.3 DOCUMENTS AS CONDITION OF PAYMENT**

- A. The Owner's approval of the current status of Project Record Documents is a prerequisite to the Architect's approval of requests for progress payment and request for final payment under the Contract.
- B. Prior to submitting each request for progress payment, secure the Owner's approval of the current status of the As-Built Documents.
- C. Prior to submitting request for final payment, submit the final As-Built Documents to the Owner and secure his approval.

## **1.4 RECORD DOCUMENTS**

- A. Job Set: Promptly following receipt of the Owner's Notice to Proceed, secure from the Architect at no charge to the Contractor one complete set of all documents comprising the Contract.

## **1.5 MAINTENANCE OF JOB SET**

- A. Maintain the job set of As-Built Documents at the site completely protected from deterioration and from loss and damage until completion of the work and transfer of all recorded data to the final Project Record Documents.
- B. Making entries on Drawings:
  - 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
  - 2. Date all entries.
  - 3. Call attention to the entry by drawing a box or other shape in a manner that avoids confusion with the original shapes and elements on the drawing around the area or areas affected.
  - 4. In the event of overlapping changes, use different colors for the overlapping changes.
- C. Make entries in the pertinent other documents as approved by the Owner.

## **1.6 REVIEW AND SUBMITTAL**

- A. Submit the completed set of As-Built Documents to the Architect for approval.
- B. Participate in review meetings as required.
- C. Make required changes and promptly deliver the final As-Built Documents to the Architect.

## **1.7 CHANGES SUBSEQUENT TO ACCEPTANCE**

- A. The Contractor has no responsibility for recording changes in the work subsequent to Final Completion and acceptance by the Owner.

## **PART 2 PRODUCTS**

Not Used

## **PART 3 EXECUTION**

Not Used

END OF SECTION



## SECTION 01730

### OPERATION AND MAINTENANCE MANUALS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Submit manuals containing operation and maintenance data for all electrical and mechanical equipment provided in the Project.

##### 1.2 SUBMITTALS

- A. General: Submit following in accordance with Conditions of the Contract and requirements of Division 1 specification sections.
- B. Approval Copies of Operation and Maintenance Manuals:
  - 1. Submit approval copies a minimum of 30 days prior to operating instruction sessions specified in individual Sections and at the time of Substantial Completion if no field instruction is required.
  - 2. Submit (2) approval copies to Architect Engineer for review. Approval copies will be returned to Contractor with corrections noted. Correct approval copies as directed by Architect Engineer.
  - 3. All data must be approved by Architect Engineer prior to Contractor initiating final closeout procedures specified in Division 1 Section "Project Closeout."
- C. Final Copies: Submit (2) copies of corrected data to Architect Engineer a minimum of 5 days prior to operating instruction sessions specified in individual Sections and 5 days prior to final completion if no field instruction is required.

##### 1.3 DATA FORMAT

- A. Group data into sections corresponding to specification sections bound in hardback binders with index tabs and pockets for holding folded sheet information.
- B. Inscribe the following on binders:
  - 1. The words "OPERATION AND MAINTENANCE DATA".
  - 2. Name and location of project.
  - 3. Project Code.
  - 4. Name of Division, such as "Mechanical" or "Electrical", and name of each specification section contained therein.
  - 5. Name of Contractor.
- C. Binders shall contain all applicable data specified herein. List each item of equipment and identify each item with same name, mark, number, or other

identification noted or scheduled in Contract Documents. Binders containing several items of equipment shall be provided with index tabs to separate each item.

D. The first section of each binder shall contain:

1. A table of contents;
2. Names, addresses, and telephone numbers of each subcontractor installing equipment; and name of each local representative.
3. Names, addresses, and telephone numbers of each vendor providing equipment, and name of each local representative.

#### **1.4 DATA REQUIRED**

A. Description: Provide manufacturer's catalog description supplemented as necessary to include the following:

1. Description of function of overall equipment item and description of major components. Catalog data and other preprinted literature shall have all inapplicable information crossed out.
2. System layout showing circuits, devices, and controls.
3. Wiring and control diagrams to explain detailed operation and control of each component.

B. Shop Drawings: Provide legible copies of approved shop drawings. Any comments incorporated in "corrections noted" approvals of shop drawings shall be recorded on drawings.

C. Operating Instructions:

1. Procedures for start up.
2. Sequencing of operations, as applicable.
3. Normal operating procedures covering basic overall functions of each component in relation to external inputs, outputs, controls, indicators, and alarms.
4. Procedures for shutdown.
5. Where start-up and/or shutdown of equipment operation must be performed in a particular sequence, caution notes shall be given, and text shall include clearly defined steps of procedure which describe actions to be taken.
6. Procedures for emergency operation describing whatever action should be taken to facilitate emergency operation, such as may occur as a result of momentary primary power loss or surges, excessive ambient temperature, fire alarm, and the like.

D. Maintenance and Service Instructions:

1. Manufacturer's maintenance and service manuals, including trouble-shooting guides.
2. Manufacturer's installation instructions.
3. Routine preventive maintenance schedules. Lubrication schedule, including lubricant type, grade, temperature range and frequency.
4. Parts list, including sources of supply.
5. Manufacturer's recommended spare parts list.
6. Special tools required.
7. Service organization reasonably convenient to the project site.

**1.5 QUALITY**

A. The quality of operating and maintenance data will be checked by Architect Engineer for general conformance with requirements of this Section The following checklist is representative of the characteristics which will be examined:

1. Accuracy.
2. Completeness.
3. Quality of printing:
  - a. Dropouts
  - b. Background
  - c. Legibility (no excessive reduction or filled-in characters)

**PART 2 - PRODUCTS**

(Not Used)

**PART 3 - EXECUTION**

(Not Used)

END OF SECTION

## **DIVISION 2 - SITE CONSTRUCTION**

### **SECTION 02110**

### **SITE CLEARING**

#### **PART 1 GENERAL**

##### **1.1 SUMMARY**

A. This Section includes the following:

1. Topsoil stripping.
2. Clearing and grubbing.
3. Removing above-grade improvements.
4. Removing below-grade improvements.

##### **1.2 RELATED DOCUMENTS**

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

##### **1.3 PROJECT CONDITIONS**

- A. Traffic: Conduct site-clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, driveways access lanes, walks, or other occupied or used facilities without permission from authorities having jurisdiction and / or the owner.
- B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.
1. Protect improvements on adjoining properties and on Owner's property.
  2. Restore damaged improvements to their original condition, as acceptable to property owners.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated or directed.

##### **1.4 EXISTING SERVICES**

- A. Notify utility locator services, including MISS UTILITY, a minimum of 72 hours prior to commencing field operations for area where Project is located before site clearing. Do not begin construction until all the utilities have been marked.
- B. General: Indicated locations are approximate; determine exact locations before commencing Work.

- C. Arrange and pay for disconnecting, removing, capping, and plugging utility services. Notify affected utility companies in advance and obtain approval before starting this Work.

## **PART 2 PRODUCTS**

### **2.1 SOIL MATERIALS**

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."
  - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.
  - 2. Ensure that a land disturbing permit and the proper erosion and sediment controls are in place for the off-site borrow site.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction. Transfer benchmark elevation to a protected area if the existing benchmark is within the construction limits.
- B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkway as specified in the construction documents.
- C. Protect the existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

### **3.2 UTILITIES**

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing when requested by Contractor.
  - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
  - 1. Owner will arrange to shut off indicated utilities when requested by Contractor.
  - 2. Arrange to shut off indicated utilities with utility companies.

- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify the Architect not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with the utility interruptions without Architect's written permission.
- C. Excavate for and remove underground utilities indicated to be removed.

### **3.3 SITE CLEARING**

- A. General: Remove shrubs, grass, and other vegetation, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.
- B. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.
  - 1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.
  - 2. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water and limit their height to 8'. Cover all storage piles, if needed, to prevent wind erosion.
  - 3. Do not stockpile topsoil within drip line of remaining trees
  - 4. Dispose of unsuitable or excess topsoil as specified for disposal of waste material.
  - 5. Stockpile surplus topsoil and allow for respreading deeper topsoil.
- C. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, as indicated on the drawings, generally within the limits of disturbance.
  - 1. Completely remove stumps, roots, and other debris protruding through ground surface.
  - 2. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below the exposed subgrade
  - 3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
    - a. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.

- D. Removal of Site Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.
  - 1. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
    - a. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

### **3.4 DISPOSAL OF WASTE MATERIALS**

- A. Burning is not permitted on Owner's property.
- B. All surplus demolished building materials and other waste materials, except for extra materials required by the project specifications, shall be disposed of at a VDOT approved disposal site. The contractor shall provide the owner's representative with a signed approval notification from the disposal site prior to disposal of any materials. The notification must indicate that materials from the site will be accepted and disposal is in accordance with applicable regulations.

END OF SECTION

## SECTION 02300

### EARTHWORK

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following:
1. Preparing subgrades for pavements and lawns.
  2. Excavating and backfilling for buildings and structures.
  3. Subbase course for concrete walks and pavements.
  4. Base course for asphalt paving.
  5. Subsurface drainage backfill for walls and trenches.
  6. Excavating and backfilling trenches within building lines.
  7. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
  8. Installing geotextile fabric below grade under asphalt pavement

##### 1.2 RELATED DOCUMENTS

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

##### 1.3 DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
  2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Layer placed between the subbase course and asphalt paving.
- C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations.
1. Authorized Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
  2. Bulk Excavation: Excavations more than 10 feet in width and pits more than 30



- feet in either length or width.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- K. General Excavation: Excavations for drainage structures, paving, structures, and general paving
- L. Trench Excavation: Excavations for utility and drainage pipes, lines, and drainage channels.
- M. Rip Rock: Any material that cannot be removed by scrapers, loaders, pans, dozers, or graders; and requires the use of a single-tooth ripper mounted on a crawler tractor having a minimum pull rated at not less than 56,000 pounds.
- N. Trench Rock: Rip rock encountered during trench excavation.
- O. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

#### **1.4 SUBMITTALS**

- A. Submit in accordance with Conditions of the Contract and the requirements of Section 01300 "Submittals."
- B. Product Data: Geotextile fabric.
- C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
  1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
  2. Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill and backfill.
  3. Laboratory compaction curve according to ASTM D 1557 for each on-site or

borrow soil material proposed for fill and backfill

## **1.5 QUALITY ASSURANCE**

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- B. The services of an independent testing agency will be procured by the Owner to test for field quality control. See paragraph 3.19.
- C. Pre-excavation Conference: Conduct conference at Project site to comply prior to excavation work. Attendees shall include the Architect, the Contractor, VDOT and the grading subcontractor.

## **1.6 PROJECT CONDITIONS**

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated:
- B. Notify Architect not less than two days in advance of proposed utility interruptions.
- C. Do not proceed with utility interruptions without Architect's written permission.
- D. Contact utility-locator service for area where Project is located before excavating.
- E. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

## **PART 2 - PRODUCTS**

### **2.1 SOIL MATERIALS**

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from on-site excavations.
- B. Satisfactory Soils: ASTM D 2487 soil classification groups CL, ML, SC and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. A minimum standard Proctor (ASTM D 698) maximum dry density of approximately 90 pounds per cubic feet for fill material.
- C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, MH, CH, OL, OH, and PT, or a combination of these group symbols.
  - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

- D. Backfill and Fill: Satisfactory soil materials.
- E. Subbase: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2- inch (38-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- F. Base: VDOT #21 Aggregate
- G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (38-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve. Satisfactory soils as defined above may also be used with a maximum liquid limit of 40 and a plasticity of not less than 20.
- H. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- I. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch (38-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- J. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.
- L. Select Sand: Select sand shall meet the requirements for materials and gradation in section 202-Fine Aggregate, of the Virginia Department of Transportation Road and Bridge Specifications, 2007 Edition. The size used shall be Standard size A or B as listed and defined in Table II-1, "Fine Aggregate" of the VDOT specifications

## 2.2 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
  - 1. Red: Electric.

2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

**B. Geotextile Fabric**

1. A woven geotextile fabric conforming to ASTM D 4873 with the following minimum properties

<u>Property</u>	<u>Test Procedure</u>	<u>Minimum Requirements</u>
Grab tensile strength	ASTM D 4632	300 lbs
Grab elongation	ASTM D 4632	15%
Trapezoid tear	ASTM D 4533	115 lbs
CBR puncture	ASTM D 6241	1000 lbs
UV resistance (500 hrs)	ASTM D 4355	80%
Permittivity	ASTM D 4491	4 gpm/sf
A.O.S.	ASTM D 4751	50 U.S. Sieve

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- D. Provide and install all perimeter erosion and sediment controls prior to earthwork operations.

**3.2 DEWATERING**

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
- C. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

- D. Install a dewatering system, in needed, to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

### **3.3 EXPLOSIVES**

- A. Explosives: Do not use explosives.

### **3.4 EXCAVATION, GENERAL**

- A. Classified Excavation: Excavation is classified and includes excavation to required subgrade elevations. Excavation will be classified as earth excavation, unsatisfactory soils excavation, or rock excavation as follows:
  1. Earth excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with soil and other materials encountered that are not classified as rock, unsatisfactory soils or unauthorized excavation.
  2. Intermittent drilling, blasting, or ripping to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
  3. Rock excavation includes removal and disposal of rock material and obstructions encountered and as defined as rip rock above.
  4. Unsatisfactory soils are as defined above and identified by the Owner's geotechnical testing agency.
  5. Rock and unsatisfactory soils excavation will be paid by unit prices included in the Contract Documents.
  6. Do not excavate rock and unsatisfactory soils until it has been classified and cross-sectioned by Architect.

### **3.5 EXCAVATION FOR STRUCTURES**

- A. General: In accordance with the soils report in Appendix A excavated subgrades shall be evaluated by the geotechnical engineer/special inspections agent. Localized authorized undercutting and/or in-place stabilization may be required. Controlled engineered fill shall replace undercut soils and paid for at the unit price included on the bid form.
- B. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
- C. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
- D. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility

Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.

### **3.6 EXCAVATION FOR WALKS AND PAVEMENTS**

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

### **3.7 EXCAVATION FOR UTILITY TRENCHES**

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
  - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
  - 1. Clearance: As indicated.
- C. Trench Bottoms: Excavate trenches 6 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe and fittings. Undercut 6 inches if unyielding bearing material or rock is encountered.
- D. Excavate trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

### **3.8 APPROVAL OF SUBGRADE**

- A. Notify Architect and Owner's geotechnical testing agency when excavations have reached required subgrade.
- B. If the Testing Agency determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.

### **3.9 UNAUTHORIZED EXCAVATION**

- A. Fill unauthorized excavation under foundations or wall footings by extending

bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.

- B. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

### **3.10 STORAGE OF SOIL MATERIALS**

- A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover as needed to prevent windblown dust.
- B. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### **3.11 BACKFILL**

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
  2. Surveying locations of underground utilities for record documents.
  3. Inspecting and testing underground utilities.
  4. Removing concrete formwork.
  5. Removing trash and debris.
  6. Removing temporary shoring and bracing, and sheeting.
  7. Installing permanent or temporary horizontal bracing on horizontally supported walls, if required.
- B. Restrict the maximum thickness of layers of the placement of loose fill and backfill soil materials to 6 inches when lightweight compaction equipment must be used. This would include close proximity to unbraced building walls, utility trenches and small excavations for manholes, underground vaults/boxes, etc.

### **3.12 UTILITY TRENCH BACKFILL**

- A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits
- B. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit.
  1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- C. Coordinate backfilling with utilities testing.

- D. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.
- E. Place and compact final backfill of satisfactory soil material to final subgrade.
- F. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

### **3.13 Fill**

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Place and compact fill material in layers to required elevations as follows:
  - 1. Under grass and planted areas, use satisfactory soil material.
  - 2. Under walks and pavements, use satisfactory soil material.
  - 3. Under steps and ramps, use engineered fill.
  - 4. Under building slabs, use engineered fill.
  - 5. Under footings and foundations use engineered fill.

### **3.14 MOISTURE CONTROL**

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 3 percent of optimum moisture content.
  - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
  - 2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 3 percent and is too wet to compact to specified dry unit weight.

### **3.15 COMPACTION OF BACKFILLS AND FILLS**

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
  - 1. Under structures, building slabs, work and loading areas, steps, and pavements, scarify and re-compact top 12 inches of existing subgrade and each layer of backfill or fill material at 98 percent.
  - 2. Under gravel/aggregate areas scarify and re-compact top 4 inches of existing



- subgrade and each layer of backfill or fill material at 95 percent.
3. Under lawn or unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.

### **3.16 GRADING**

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  1. Provide a smooth transition between adjacent existing grades and new grades.
  2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  1. Lawn or Unpaved Areas: Plus or minus 1 inch.
  2. Walks: Plus or minus 1 inch.
  3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

### **3.17 SUBBASE AND BASE COURSES**

- A. Under pavements and walks, place subbase course on prepared subgrade and as follows:
  1. Place base course material over subbase.
  2. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 698.
  3. Shape subbase and base to required crown elevations and cross-slope grades.
  4. When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.
  5. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.
- B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

### **3.18 GEOTEXTILE INSTALLATION**

- A. Site Preparation:
  1. Prepare area to a smooth uniform surface. Remove all sharp protruding objects.

- B. Installation
  - 1. Spread immediately ahead of covering operation. Do not expose to sunlight for more than 7 days. Lay smooth without wrinkles.
  - 2. Overlap adjoining sections a minimum of 36 inches.
  - 3. Repair all damaged fabric with patch of same material overlapping 3 feet minimum from damaged area.

### **3.19 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work complies with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. Testing agency will test compaction of soils in place according to ASTM D 698, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
  - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
  - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet or less of wall length, but no fewer than two tests.
  - 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet or less of trench length, but no fewer than two tests.
- E. When the testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained.

### **3.20 PROTECTION**

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to the specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Scarify or remove and replace soil material to depth as directed by Architect; reshape and re-compact.

- D. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

### **3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Burning is not permitted on Owner's property.
- B. All surplus demolished building materials and other waste materials, except for extra materials required by the project specifications, shall be disposed of at a VDOT approved disposal site. The contractor shall provide the owner's representative with a signed approval notification from the disposal site prior to disposal of any materials. The notification must indicate that materials from the Van Dorn site will be accepted and disposal is in accordance with applicable regulations.

END OF SECTION

**SECTION 02510**  
**ASPHALT PAVEMENT**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Includes But Not Limited To:

1. Prepare pavement sub-grade as described in Contract Documents to receive pavement base and paving.
2. Furnish and install pavement base and asphaltic concrete paving in parking, entrance and drive lanes as described in Contract Documents.

B. Related Sections:

1. Section 02300: Earthwork

**1.2 SUBMITTALS**

A. Quality Assurance / Control:

1. Submit certification from Asphalt batch plant for proposed mix design of each class of mix for information prior to beginning of work.
2. Copies of test results from tests conducted to assure compliance to Contract Document requirements.

**1.3 QUALITY ASSURANCE**

A. Qualifications: Paving contractor to be certified and experienced with installing and finishing VDOT Superpave Asphalt Concrete.

B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with industry standards, the specified requirements and the methods for proper performance of the work of this section.

C. Asphalt Mixing Plant: VDOT Certified

D. Obtain Materials from same source throughout project

E. Pre-Installation Conferences:

1. Schedule paving pre-installation conference after staking out all areas requiring asphalt paving and after the base aggregate is installed.

**1.4 PROJECT CONDITIONS**

A. Environmental Requirements:

1. Do not perform work during following conditions:

- a. Ambient temperature and / or surface temperature of base below 50 deg F.
- b. Presence of free surface water.
- c. Over-saturated base and sub-grade materials.
- d. Rainy or foggy weather

## **PART 2 - PRODUCTS**

### **2.1 MATERIAL**

#### A. Base:

##### 1. New Aggregate Base:

- a. Road Base type gravel or crushed stone shall be VDOT Type I Aggregate, No 21 A and shall conform with materials specified in Section 208 of the VDOT Road and Bridge Specifications
- b. Quality Requirements as established by testing:
  - 1) R-value: 70 minimums.
  - 2) Sand Equivalent: 25 minimums.
  - 3) Durability Index: 35 minimum.

B. Asphalt Cement Primer: Meet requirements of ASTM D 2027, MC 70, plus or minus one grade.

C. Tack Coat: Shall be VDOT RC-250 or equivalent

#### D. Superpave Asphalt Concrete Pavement Mixture:

1. Asphalt Concrete Base Mixture: VDOT BM-25.0A bituminous concrete
2. Asphalt Concrete Surface Mixture: VDOT SM-9.5A bituminous concrete

#### E. Asphalt Cement:

1. All asphalt cement shall conform to the current Superpave specifications for the above mixtures Specifications

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

A. Survey and stake parking surfaces to show grading required by Contract Documents.

#### B. Sub-Grade:

1. Finish grade parking surface area to grades required by Contract Documents.
2. Compact sub-grade as specified in Section 02300.

#### C. Work Area Protection

1. On-site, provide and maintain temporary signs, signals, lighting devices, markings, and barricades to protect personnel and new construction from damage by equipment and vehicles until the Architect approves the surface.

## 3.2 PREPARATION

- A. Protect finished surfaces adjacent to asphalt work from overspray, damage by equipment, etc.
- B. For repair work, cut existing surface back to undisturbed material to provide uniform division lines between existing and new work.
- C. Butt new work to existing surfaces to result in smooth transitions and uniform sections.
- D. Before placing surface, inspect the subgrade and base for conformity with the specified section. If necessary, remove or add material to bring all portions of the subgrade and base to proper section and correct elevation. Thoroughly compact and inspect the adjusted section after correcting.

## 3.3 INSTALLATION

- A. Site Tolerances:
  - 1. Sub-Grade: 1 inch high. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
  - 2. Sub-Base:
    - a. Base shall be 8 inches thick minimum after compaction, except where shown thicker on drawings.
    - b. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
  - 3. Paving:
    - a. Apply asphaltic concrete paving in single 3.0 inch lift for the BM-25.0 and a single 1.5 inch for the SM-9.5 Surface. Pavement thicknesses are after compaction
    - b. Surface texture of hand worked areas shall match texture of machine-laid areas.
- B. Base:
  - 1. For Asphalt Pavement: Begin spreading base material at the point nearest the source of supply. Permit traffic and hauling over the base. Fill ruts formed by traffic and reroll. After base course placement, continue machining and rolling until surface is smooth, compacted, well bonded, and true to the designed cross section. Compact to 100 percent ASTM D-698 maximum dry density. Maintain the base smooth and true to grade and cross section until asphaltic concrete placement
  - 2. If roller is smaller than 8 ton, lay gravel and compact in two courses.
  - 3. Compact as specified in Section 02300.
  - 4. Priming: Prime base with application of 0.2 to 0.5 of asphalt cement primer per square yard if pavement will be laid more than three days after compaction of base, or if precipitation is anticipated between completion of compaction of base and laying of pavement.
  - 5. Re-compact unprimed base if it receives precipitation before pavement is laid.
  - 6. Remove or repair improperly prepared areas as directed by Architect.

- C. Asphalt Paving:
1. Tack coat vertical concrete surfaces that will be in contact with paving with RC-250 at a rate of 0.1 gallons per square yards.
  2. Uniformly mix materials so aggregate is thoroughly coated with asphalt.
  3. Place at temperatures between 250 and 325 degrees Fahrenheit with a self-propelled laydown machine.
  4. Longitudinal bituminous joints shall be vertical and properly tack coated if cold. Transverse joints shall always be tack coated.
  5. Compaction:
    - a. Compact asphalt paving to 96 percent minimum. Determine percent compaction by dividing density of test cores as determined by either ASTM D 1188 or ASTM D 2726 by laboratory compacted density as determined by ASTM D 1559. Maximum total air voids in completed asphaltic concrete shall be 8 percent as determined by ASTM D 2041.
    - b. Roll with powered equipment capable of obtaining specified density.
    - c. Begin breakdown rolling immediately after asphalt is placed when asphalt temperature is at maximum. Complete breakdown rolling before mix temperature drops below 240 degrees Fahrenheit. Complete handwork compaction concurrently with breakdown rolling.
    - d. Complete intermediate rolling as soon as possible after breakdown rolling and before mix temperature drops below degrees Fahrenheit. Do not roll paving for compaction purposes after asphalt temperature falls below 185 deg F.
    - e. Execute compaction so visibility of joints is minimized. Complete finish rolling to improve asphalt surface as soon as possible after intermediate rolling and while asphalt paving is still warm. Do not use vibration for finish rolling.
  6. Surface shall be uniform with no 'birdbaths.' Leave finished surfaces clean and smooth. Variations from specified grades shall not exceed 1/2 inch.

### **3.4 FIELD QUALITY CONTROL**

- A. Site Tests: When tested with 10 foot straight edge, surface of completed work shall not contain irregularities in excess of 1/4 inch.
- B. The Owner's representative will be obtaining cored in-place samples for laboratory testing.

END OF SECTION

## **DIVISION 3 - CONCRETE**

### **SECTION 03300**

#### **CAST-IN-PLACE CONCRETE**

#### **PART 1 GENERAL**

##### **1.1 SUMMARY**

- A. Section Includes: Cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

##### **1.2 SUBMITTALS**

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixes: For concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mix water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.
- E. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.
- F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
  - 1. Cementitious materials and aggregates.
  - 2. Form materials and form-release agents.
  - 3. Steel reinforcement and reinforcement accessories.
  - 4. Admixtures.
  - 5. Curing materials.



### **1.3 QUALITY ASSURANCE**

- A. **Manufacturer Qualifications:** A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
  - 1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
- B. **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 formwork and shoring and reshoring installations that are similar to those indicated for this Project in material, design, and extent.
- C. **Source Limitations:** Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- D. **Welding:** Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- E. **ACI Publications:** Comply with the following, unless more stringent provisions are indicated:
  - 1. ACI 301, "Specification for Structural Concrete."
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

## **PART 2 PRODUCTS**

### **2.1 FORM-FACING MATERIALS**

- A. **Smooth-Formed Finished Concrete:** Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - a. Structural 1, B-B, or better, mill oiled and edge sealed.
    - b. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.

- B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of the exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes not larger than 1 inch (25 mm) in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## **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.

## **2.3 REINFORCEMENT ACCESSORIES**

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
- B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

## **2.4 CONCRETE MATERIALS**

- A. Portland Cement: ASTM C 150, Type I.
  - 1. Fly Ash: ASTM C 618, Class C or F.
  - 2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:

1. Class: Moderate weathering region, but not less than 3M.
2. Nominal Maximum Aggregate Size: 1-1/2 inches (38 mm).

C. Water: Potable and complying with ASTM C 94.

## **2.5 ADMIXTURES**

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

## **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) 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,

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

G. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Evaporation Retarder:

- a. Eucobar; Euclid Chemical Co.
- b. Vapor Aid; Kaufman Products, Inc.
- c. E-Con; L&M Construction Chemicals, Inc.
- d. Confilm; Master Builders, Inc.
- e. SikaFilm; Sika Corporation.

2. Clear, Waterborne, Membrane-Forming Curing Compound:

- a. Safe-Cure & Seal 20; ChemMasters.

- b. Diamond Clear VOX; Euclid Chemical Co.
  - c. SureCure; Kaufman Products Inc.
  - d. Dress & Seal WB; L&M Construction Chemicals, Inc.
  - e. Vocomp-20; W. R. Meadows, Inc.
3. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:
- a. Klear-Kote Cure-Sealer-Hardener, 30 percent solids; Burke Group, LLC (The).
  - b. Polyseal WB; ChemMasters.
  - c. Lumiseal WB Plus; L&M Construction Chemicals, Inc.
  - d. Vocomp-30; W. R. Meadows, Inc.

## 2.7 VAPOR RETARDERS

- A. Vapor Retarder: ASTM E 1745, Class C, of one of the following materials; or polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick:
- 1. Nonwoven, polyester-reinforced, polyethylene coated sheet; 10 mils (0.25 mm) thick.

## 2.8 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) 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. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- 1. Evaporation Retarder:
    - a. Spray-Film; ChemMasters.
    - b. Eucobar; Euclid Chemical Co.
    - c. Vapor Aid; Kaufman Products, Inc.
    - d. E-Con; L&M Construction Chemicals, Inc.
    - e. Confilm; Master Builders, Inc.
    - f. SikaFilm; Sika Corporation.

2. Clear, Waterborne, Membrane-Forming Curing Compound:
  - a. Safe-Cure & Seal 20; ChemMasters.
  - b. Diamond Clear VOX; Euclid Chemical Co.
  - c. SureCure; Kaufman Products Inc.
  - d. Dress & Seal WB; L&M Construction Chemicals, Inc.

## **2.9 RELATED MATERIALS**

- A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

## **2.10 REPAIR MATERIALS**

- A. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm).
  1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by topping manufacturer.
  4. Compressive Strength: Not less than 5700 psi (39 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## **2.11 CONCRETE MIXES**

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
  1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Footings and Foundation Walls: Proportion normal-weight concrete mix as follows:
  1. Compressive Strength (28 Days): 4000 psi
  2. Maximum Slump: 4 1/2 inches.
  3. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches after admixture is added to concrete with 2- to 4-inch slump.
- D. Slab-on-Grade: Proportion normal-weight concrete mix as follows:
  1. Compressive Strength (28 Days): 4000 psi.

2. Maximum Slump: 4 ½ inches.
- E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 15 percent.
  2. Combined Fly Ash and Pozzolan: 15 percent.
  3. Ground Granulated Blast-Furnace Slag: 25 percent.
- F. Maximum Water-Cementitious Materials Ratio: 0.45 for concrete exposed to deicers or subject to freezing and thawing while moist.
- G. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 6 percent plus or minus 1-1/2 percent, unless otherwise indicated.
- H. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete and concrete with a water-cementitious materials ratio below 0.50.

## **2.12 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; 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. Mix concrete materials in appropriate drum-type batch machine mixer.
1. 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).
  2. 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, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch (3 mm).
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
  - 1. Do not use rust-stained steel form-facing material.
- F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- G. Chamfer corners or edges of concrete.
- H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### **3.2 EMBEDDED ITEMS**

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor bolts, accurately located, to elevations required. Coordinate with Section Fabric Roof Structure and other applicable sections.
2. Install reglets to receive top edge of foundation sheet waterproofing and membrane roofing.

### **3.3 REMOVING AND REUSING FORMS**

- A. General: Formwork, for sides of walls and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Leave formwork, for beam soffits, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:
  1. Determine compressive strength of in-place concrete by testing representative field- or laboratory-cured test specimens according to ACI 301.
- C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### **3.4 VAPOR RETARDERS**

- A. Vapor Retarder: Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 and manufacturer's written instructions.

### **3.5 STEEL REINFORCEMENT**

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Shop- or field-weld reinforcement according to AWS D1.4.



- F. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
  - 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- 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 to a radius of 1/8 inch (3 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool 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-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as, foundation walls, grade beams, and other locations, as indicated.
  - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  - 2. Terminate full-width joint-filler strips not less than 1/2 inch (12 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
  - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

### 3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect or the Testing Company representative.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
  - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
  - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
- F. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

G. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

H. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### **3.8 FINISHING FORMED SURFACES**

- A. 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) in height.
- B. 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.

### **3.9 FINISHING FLOORS AND SLABS**

- A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high

- spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
- C. Broom Finish: Apply a broom finish to exterior and interior concrete slabs, steps, and ramps, and elsewhere as indicated.
    - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

### **3.10 MISCELLANEOUS CONCRETE ITEMS**

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

### **3.11 CONCRETE PROTECTION AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.

### **3.12 CONCRETE SURFACE REPAIRS**

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface.

- Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Compact mortar in place and strike off slightly higher than surrounding surface.
  3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  4. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  5. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

### **3.13 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

- C. Testing Frequency: Obtain one composite sample 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.
1. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.  
Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
  2. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
  3. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
  4. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of five standard cylinder specimens for each composite sample.
  5. Compressive-Strength Tests: ASTM C 39;
    - a. Test two field-cured specimens at 7 days and two at 28 days.
    - b. Hold one specimen as a spare.
    - c. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
- D. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- E. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- F. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- G. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- H. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

END OF SECTION

## **DIVISION 4 - MASONRY**

### **SECTION 04200**

#### **UNIT MASONRY**

## **PART 1 GENERAL**

### **1.1 SUMMARY**

- A. This Section includes the following:
1. Standard concrete unit masonry.
  2. Split face concrete unit masonry
  3. Masonry accessories.
  4. Mortar and grout.

### **1.2 PERFORMANCE REQUIREMENTS**

- A. Provide concrete unit masonry that develops the following installed compressive strengths ( $f'm$ ) at 28 days.
1. Based on net area:  $f'm = 1500$  psi (10.3 MPa).

### **1.3 SUBMITTALS**

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each different masonry unit, accessory, and other manufactured product specified.
- C. Material certificates for the following, signed by manufacturer and Contractor, certifying that each material complies with requirements.
1. Each different cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
  2. Each material and grade indicated for reinforcing bars.
  3. Each type and size of joint reinforcement.
- D. Material test reports from a qualified independent testing agency, employed and paid by Contractor or manufacturer, indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
1. Mortar complying with property requirements of ASTM C 270.



2. Grout mixes. Include description of type and proportions of grout ingredients.
3. Masonry units.

#### **1.4 QUALITY ASSURANCE**

- A. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture, from one source and by a single manufacturer for each different product required.
- B. Preconstruction Testing
  1. Owner will select a qualified independent testing agency to perform preconstruction testing indicated below. Payment for these services will be made by Owner.
  2. The compressive strength of masonry shall be determined based on strength of the unit and type of mortar specified (Unit Strength Method) per CBC Table 2105.2.2.1.2.
    - a. Concrete Masonry Units: Test per ASTM C140.
    - b. Grout: Test per ASTM C1019.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not install until they are in an air-dried condition.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

#### **1.6 PROJECT CONDITIONS**

- A. Protection of Masonry: During erection, 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.

- B. 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 mortar splatter by coverings spread 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.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen sub-grade or setting beds. Remove and replace unit masonry damaged by frost or freezing conditions. Comply with the following requirements:
1. Cold-Weather Construction: When the ambient temperature is within the limits indicated, use the following procedures:
    - a. 40 to 32 deg F (4 to 0 deg C): Heat mixing water or sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C).
    - b. 32 to 25 deg F (0 to -4 deg C): Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry.
    - c. 25 to 20 deg F (-4 to -7 deg C): Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F (4 deg C) if grouting. Use heat on both sides of walls under construction.
    - d. 20 deg F (-7 deg C) and Below: Heat mixing water and sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C). Heat grout materials to produce grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing until used in masonry. Heat masonry units to 40 deg F (4 deg C). Provide enclosures and use heat on both sides of walls under construction to maintain temperatures above 32 deg F (0 deg C) within the enclosures.
  2. Cold-Weather Protection: When the mean daily temperature is within the limits indicated, provide the following protection:
    - a. 40 to 25 deg F (4 to -4 deg C): Cover masonry with a weather-resistant membrane for 48 hours after construction.

- b. 25 to 20 deg F (-4 to -7 deg C): Cover masonry with insulating blankets or provide enclosure and heat for 48 hours after construction to prevent freezing. Install wind breaks when wind velocity exceeds 15 mi./h (25 km/h).
  - c. 20 deg F (-7 deg C) and Below: Provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 48 hours after construction.
3. 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 out, but not less than 7 days after completion of cleaning.
- D. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F (38 deg C) and above.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1. Joint Reinforcement, Ties, and Anchors:
    - a. AA Wire Products Co.
    - b. Dur-O-Wal, Inc.
    - c. Hohmann & Barnard, Inc.
    - d. Masonry Reinforcing Corp. of America.
    - e. National Wire Products Industries.

### **2.2 CONCRETE MASONRY UNITS**

- A. General: Provide shapes indicated and as follows for each form of concrete masonry unit required.
- 1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
  - 2. Provide square-edged units for outside corners, except where indicated as bullnose.
- B. Concrete Masonry Units: ASTM C 90 and as follows:

1. Weight Classification: Lightweight.
  2. Provide Type I, moisture-controlled units.
  3. Size: Manufactured to the actual dimensions listed below (within tolerances specified in the applicable referenced ASTM specification) for the corresponding nominal sizes indicated on Drawings:
    - a. 4 inch (100 mm) nominal: 3-5/8 inch ( 92 mm) actual.
    - b. 6 inch (150 mm) nominal: 5-5/8 inch (143 mm) actual.
    - c. 8 inch (200 mm) nominal: 7-5/8 inch (194 mm) actual.
    - d. 10 inch (250 mm) nominal: 9-5/8 inch (244 mm) actual.
- C. Interior Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.
- D. Exterior Exposed Faces: Split face manufacturer's standard color, unless otherwise indicated. Score at 8 inches where indicated.
- E. Special Shapes:
1. Split Sill: Solid, vertical split face with smooth sloped surface.
  2. 4 inch split face
  3. Other shapes as indicated.

## **2.3 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.
- B. Portland Cement Mix: Portland cement complying with ASTM C 150, Type I or Type III.
- C. Aggregate for Mortar: ASTM C 144
- D. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.
- E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar.
- F. Water: Potable.
- G. REINFORCING STEEL
- H. Steel Reinforcing Bars: Billet steel complying with ASTM A 615 (ASTM A 615M), Grade 60 (Grade 400).

## 2.4 JOINT REINFORCEMENT

- A. General: Provide joint reinforcement formed from the following: ASTM A951. Maximum spacing of cross wires in ladder-type and points of connection of cross wires of truss-type joint reinforcement shall be 16 in.
- B. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet (3 m), with prefabricated corner and tee units, and complying with requirements indicated below:
  - 1. Wire Diameter for Side Rods: 0.1483 inch (3.8 mm).
  - 2. Wire Diameter for Cross Rods: 0.1483 inch (3.8 mm).
- C. For single-wythe masonry, provide truss design with continuous diagonal cross rods spaced not more than 16 inches (407 mm) o.c.

## 2.5 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Type 2, Class A, Grade 1; compressible up to 35 percent; of width and thickness indicated; formulated from the neoprene.
- B. Preformed Control-Joint Gaskets: Styrene-butadiene rubber compound, ASTM D 2000, Designation M2AA-805., 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. Stainless Steel Drip-Edge Flashing: 26 gage X 3" wide with ½" drip hemmed back 3/8" X 10 ft long. Material Stainless Steel.
- E. Self-Adhered Transition Flashing: Multipurpose, self-adhered flashing with modified butyl adhesive, polyester fiber top sheet, and polypropylene interlayer.
  - 1. Application: Primerless adhesion for use as through-wall flashings and wall transitions just above grade.
  - 2. Thickness: 45 mil, 0.045 inch, nominal.

## 2.6 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. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, in order to ensure that mortar color is consistent.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for job-mixed mortar; and ASTM C 1142 for ready-mixed mortar, of type S.
- C. Bond-Breker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. asphalt felt).
- D. Grout for Unit Masonry: Comply with ASTM C 476. Use grout of consistency indicated or, if not otherwise indicated, of consistency (fine or coarse) at time of placement that will completely fill spaces intended to receive grout.
  - 1. Use fine grout in grout spaces less than 2 inches (50 mm) in horizontal dimension, unless otherwise indicated.
  - 2. Use coarse grout in grout spaces 2 inches (50 mm) or more in least horizontal dimension, unless otherwise indicated.

## **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 unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

### **3.2 INSTALLATION, GENERAL**

- A. Build chases and recesses to accommodate items specified in this and other Sections of the Specifications.
- B. Leave openings for equipment to be installed before completion of masonry. After installing equipment, complete masonry to match construction immediately adjacent to the opening.

- C. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

### **3.3 CONSTRUCTION TOLERANCES**

- A. Variation from Plumb: For vertical lines and surfaces of columns, walls, and arrises, do not exceed 1/4 inch in 10 feet (6 mm in 3 m), nor 3/8 inch in 20 feet (10 mm in 6 m), nor 1/2 inch in 40 feet (12 mm in 12 m) or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch in 40 feet (12 mm in 12 m) or more. For vertical alignment of head joints, do not exceed plus or minus 1/4 inch in 10 feet (6 mm in 3 m), nor 1/2 inch (12 mm) maximum.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch in 40 feet (12 mm in 12 m) or more. For top surface of bearing walls, do not exceed 1/8 inch (3 mm) in 10 feet (3 m), nor 1/16 inch (1.5 mm) within width of a single unit.
- C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls, and partitions, do not exceed 1/2 inch in 20 feet (12 mm in 6 m), nor 3/4 inch in 40 feet (19 mm in 12 m) or more.
- D. Variation in Cross-Sectional Dimensions: For thickness of walls, from dimensions shown, do not exceed minus 1/4 inch (6 mm) nor plus 1/2 inch (12 mm).
- E. Variation in Mortar-Joint Thickness: Do not vary from bed-joint 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 bed-joint thickness from bed-joint thickness of adjacent course by more than 1/8 inch (3 mm). Do not vary from head-joint thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary head-joint thickness from adjacent head-joint thickness by more than 1/8 inch (3 mm). Do not vary from collar-joint thickness indicated by more than minus 1/4 inch (6 mm) or plus 3/8 inch (10 mm)

### **3.4 LAYING MASONRY WALLS**

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.

- B. Lay walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.
- C. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
  - 1. One-half running bond with vertical joint in each course centered on units in courses above and below.
- D. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar prior to laying fresh masonry.
- E. Built-in Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, and similar items, unless otherwise indicated.

### **3.5 MORTAR BEDDING AND JOINTING**

- A. Lay hollow concrete masonry units as follows:
  - 1. With full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
  - 2. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
  - 3. Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 3/8-inch (10-mm) joints.
- B. Tool joints slightly concave when thumbprint hard, using a jointer larger than joint thickness.

### **3.6 HORIZONTAL JOINT REINFORCEMENT**



- A. General: Provide continuous horizontal-joint reinforcement as indicated. 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 reinforcing a minimum of 6 inches (150 mm).
  - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
  - 2. Provide reinforcement in mortar joint 1 block course above and below wall openings and extending 12 inches (305 mm) beyond opening.
  - 3. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

### **3.7 CONTROL JOINTS**

- A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Install preformed control-joint gaskets designed to fit standard sash block.

### **3.8 INSTALLATION OF REINFORCED UNIT MASONRY**

- A. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
  - 1. Do not exceed the following pour heights for fine grout:
    - a. For minimum widths of grout spaces of 2-1/2 inches (63 mm) or for minimum grout space of hollow unit cells of 2-1/2 by 3 inches (63 by 76 mm), pour height of 12 feet (3.6 m).
    - b. For minimum widths of grout spaces of 3 inches (76 mm) or for minimum grout space of hollow unit cells of 3 by 3 inches (76 by 76 mm), pour height of 24 feet (7.3 m).
  - 2. Do not exceed the following pour heights for coarse grout:
    - a. For minimum widths of grout spaces of 2-1/2 inches (63 mm) or for minimum grout space of hollow unit cells of 3 by 3 inches (76 by 76 mm), pour height of 12 feet (3.6 m).

- b. For minimum widths of grout spaces of 3 inches (76 mm) or for minimum grout space of hollow unit cells of 3 by 4 inches (76 by 101 mm), pour height of 24 feet (7.3 m).

### **3.9 FIELD QUALITY CONTROL**

- A. The Owner will employ and pay a qualified independent testing agency to perform the following testing for field quality control. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. The Owner will engage and pay for the services of an independent testing agency to perform the following testing for field quality control. Payment for these services will be made from the Inspection and Testing Allowance, as authorized by Change Orders. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- C. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. (460 sq. m) of wall area or portion thereof.
- D. Mortar properties will be tested per property specification of ASTM C 270.
- E. Mortar composition and properties will be evaluated per ASTM C 780.
- F. Grout will be sampled and tested for compressive strength per ASTM C 1019.
- G. Prism-Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM E 447, Method B, and as follows:
  - 1. Prepare 1 set of prisms for testing at 7 days and 1 set for testing at 28 days.
- H. Evaluation of Quality-Control Tests: In the absence of other indications of noncompliance with requirements, masonry will be considered satisfactory if results from construction quality-control tests comply with minimum requirements indicated.

### **3.10 MASONRY WATERPROOFING COATING**

- A. General: Apply masonry waterproofing according to manufacturer's directions.
- B. Do not apply over dirt, efflorescence, grease, damaged surfaces, or conditions detrimental to formation of a durable waterproof coating.
  - 1. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer.

2. Apply additional coats if undercoats, stains, or other conditions show through final coat of finish until film is of uniform finish, color, and appearance.
- C. Scheduling Application: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
  - D. Application Procedures: Apply waterproofing by brush or heavy knap roller according to the manufacturer's directions.
    1. Brushes: Use brushes recommended by the waterproofing manufacturer.
  - E. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
  - F. Apply coatings prior to installing control joint sealant. Do not apply over the sealant.
  - G. Apply base coat from footing up. Apply color coat from 6 inches below grade up.

### **3.11 REPAIRING, POINTING, AND CLEANING**

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, 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 application of sealants.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to 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. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain present on exposed surfaces.

- E. Protection: Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

### **3.12 MASONRY WASTE DISPOSAL**

- A. Recycling: Undamaged, excess masonry materials are Contractor's property and shall be removed from the Project site for his use.
- B. Excess Masonry Waste: Remove excess and legally dispose of off Owner's property.

END OF SECTION

## **DIVISION 5 - METALS**

### **SECTION 05120**

#### **STRUCTURAL STEEL**

#### **PART 1 GENERAL**

##### **1.1 SUMMARY**

- A. This Section includes structural steel.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Inspection and Tests" for independent testing agency procedures and administrative requirements.
  - 2. Division 5 Section "Miscellaneous Metals" for loose steel bearing plates and miscellaneous steel framing.
  - 3. Division 9 Section "Painting" for surface preparation and priming requirements.

##### **1.2 PERFORMANCE REQUIREMENTS**

- A. Engineering Responsibility: Engage a fabricator who utilizes a qualified professional engineer to prepare calculations, Shop Drawings, and other structural data for structural steel connections.

##### **1.3 SUBMITTALS**

- A. General: Submit in accordance with Conditions of the Contract and requirements of Section 01300 "Submittals".
- B. Shop Drawings detailing fabrication of structural steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
- C. Mill test reports signed by manufacturers certifying that their products, including the following, comply with requirements.
  - 1. Structural steel, including chemical and physical properties.
  - 2. Nonshrink grout.

## **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel." Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
  - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
  - 2. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. Structural Steel Shapes, Plates, and Bars: As follows:
  - 1. Carbon Steel: ASTM A 36 (ASTM A 36M).
  - 2. Steel Shapes: ASTM A 992 Grade 50 ksi.
  - 3. Steel Tubes: ASTM A 500 Grade B,  $F_y = 46$  ksi.
- B. Anchor Rods, Nuts, and Washers: As follows:
  - 1. Unheaded Rods: ASTM A 36 (ASTM A 36M).
  - 2. Finish: Hot-dip zinc-coating, ASTM A 153, Class C.
- C. Welding Electrodes: Comply with AWS requirements.
- D. Bolts: ASTM A307

## **2.2 GROUT**

- A. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application, and a 30-minute working time.

## **2.3 FABRICATION**

- A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.
- B. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings.
  - 1. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

## **2.4 SHOP PRIMING**

- A. Shop prime steel surfaces with one coat of Fabricator's standard red oxide primer.
- B. Where paint is interrupted by field welding of beams to bearing plates, clean the affected areas and prime with shop primer.

# **PART 3 EXECUTION**

## **3.1 EXAMINATION**

- A. Before erection proceeds, and with the steel erector present, verify elevations of concrete and masonry bearing surfaces and locations of anchorages for compliance with requirements.
- B. Do not proceed with erection until unsatisfactory conditions have been corrected.

## **3.2 PREPARATION**

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

## **3.3 ERECTION**

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.

- C. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
  - 1. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
    - a. Comply with manufacturer's instructions for proprietary grout materials.
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
- E. Do not use thermal cutting during erection.

### **3.4 FIELD CONNECTIONS**

- A. Install and tighten non high-strength bolts.
- B. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
  - 1. Comply with AISC specifications referenced in this Section for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
  - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.
  - 3.

### **3.5 FIELD QUALITY CONTROL**

- A. Owner will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports.
  - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
- C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

END OF SECTION



## SECTION 05500

### MISCELLANEOUS METALS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Provide all bolts, anchors, plates, angles and other materials necessary for the work, all stock or standard items, and all specially constructed work of a miscellaneous metal nature as indicated or required for completion.

##### 1.2 SUBMITTALS

- A. Shop drawings detailing fabrication and installation of handrail and guardrail system. Include plans, elevations, sections, and details. Show anchorage and accessory items.

##### 1.3 GENERAL

- A. In addition to the items listed herein, provide in accordance with the drawings all miscellaneous metal work required for proper completion of the project, except as specified under other sections.
- B. Coordinate the work under this section with that specified in other sections in order that all necessary items be provided as required. Include supplementary parts needed to complete each item, even though such work is not shown or specified. Furnish all miscellaneous bolts and anchors necessary for completion of the work. Anchors not shown in detail on the drawings shall conform to the accepted practices of the trade and shall be as approved by the Architect. Provide all miscellaneous supporting members, braces, and framing members, including but not limited to those required for mechanical and electrical equipment.
- C. Hot-dip galvanize supports on the exterior side of exterior walls and anchors and bolts in exterior walls. Anchors and bolts in other locations shall be zinc-coated or asphalt painted.
- D. Miscellaneous metal work shall be well formed to shape and size, with sharp lines and angles. Shearing and punching shall produce clean, true lines and surfaces. Weld or bolt permanent connections unless otherwise specified. Exposed surfaces shall have a smooth finish and sharp, well defined lines and arises. Work shall be evenly formed or bent to curves. Mill joints to a close fit. Provide the necessary lugs and brackets. Drill holes for bolts and screws. Conceal fastenings where practicable. Thickness of metal and details of assembly supports shall give ample strength and stiffness. Form joints exposed to the weather to exclude water. Riveting, where exposed, shall be flush.

- E. Weld in conformance with of AWS D1.1. Welding shall be continuous along entire area of contact unless otherwise indicated, and except where tack welding is permitted. Tack welding will not be permitted on exposed surfaces. Exposed welds shall be ground smooth.
- F. Gages of sheet ferrous metal, as specified, are U.S. Standard for sheet and plate. Gages of nonferrous metals are Brown and Sharp. Extruded sections shall be at least 1/8 inch thick, unless otherwise specified, or, where no gages are shown or specified, aluminum shall be not less than 1/8 inch thick, steel and stainless steel not lighter than No. 18 gage.

#### **1.4 DISSIMILAR METALS**

- A. Take every precaution to prevent electrolytic action between dissimilar metals on all exterior work and on interior work exposed to moisture or high humidity. Copper shall not be used in connection with aluminum work, nor shall aluminum be based where copper compounds could drain on the bare aluminum. Steel in contact with aluminum shall be painted one coat of zinc-chromate primer (and one coat of bituminous paint.) Aluminum in contact with masonry or concrete shall be painted on contact surfaces with two coats of aluminum-pigmented bituminous paint. Stainless steel shall not contact carbon steel or zinc.

#### **1.5 SEALING**

- A. Work under this section shall be weathertight in every respect. Coordinate this work with the work specified in Section 07920 - Joint Sealants to accomplish necessary sealing.

### **PART 2 PRODUCTS**

#### **2.1 MATERIALS**

- A. Structural Steel Members: ASTM A 36.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Steel Tube: ASTM A 500,  $F_y = 46$  ksi, Grade B.
- D. Hot-Dip Galvanized Zinc Coatings: ASTM A 123, A 153, or A 525, coating designation G90, as applicable.
- E. Welded Headed Stud Anchors: ASTM A 108, Grade 60, Designation 1015, AWS D1.1
- F. Shop Primers: Provide primers that comply with Division 9 Section "Painting."

## **2.2 FABRICATION, GENERAL**

- A. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- B. Shear and punch metals cleanly and accurately.
- C. Remove sharp or rough areas on exposed surfaces.
- D. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and welded surface matches contours of adjoining surfaces.
- E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- F. Shop Assembly: Pre-assemble in shop to greatest extent possible to minimize field splicing and assembly. Use connections that maintain structural value of joined pieces. Clearly mark units for field assembly and coordinated installation.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Fit exposed connections accurately together to form tight, hairline joints.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for miscellaneous metal fabrications. Set metal fabrications accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.
- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.
4. .At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and welded surface matches contours of adjoining surfaces.

D. Repair galvanized surfaces damaged by field welding or other causes.

END OF SECTION

## **DIVISION 6 – WOOD AND PLASTICS**

### **SECTION 06100**

#### **CARPENTRY**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Structural and non-structural dimension lumber framing.
- B. Sheathing.
- C. Preservative treated wood materials.
- D. Miscellaneous framing and sheathing.
- E. Miscellaneous wood nailers, furring, and grounds.

##### **1.2 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

#### **PART 2 PRODUCTS**

##### **2.1 DIMENSION LUMBER**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

##### **2.2 CONSTRUCTION PANELS**

- A. Roof Sheathing: APA Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
  - 1. Span Rating: 24/0.
  - 2. Thickness: 5/8 inch, nominal.
- B. Wall Sheathing: 1/2 inch APA Structural I Rated Sheathing, Exterior Exposure Class.

##### **2.3 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A.
- B. H Clips: Galvanized, as required by code.

## **2.4 FACTORY WOOD TREATMENT**

### **A. Preservative Treatment:**

1. Preservative Pressure Treatment of Lumber Above Grade: AWPA Use Category UC3B, Commodity Specification A (Treatment C2) using waterborne preservative to 0.25 lb/cu ft retention.
  - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
  - b. Treat lumber in contact with roofing, flashing, or waterproofing.
  - c. Treat lumber in contact with masonry or concrete.
  - d. Plywood sheathing does not need to be treated.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Coordinate installation of rough carpentry members specified in other sections.

### **3.2 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.

### **3.3 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

### **3.4 INSTALLATION OF CONSTRUCTION PANELS**

- A. Roof Sheathing: Secure panels perpendicular to framing members, with ends staggered and sheet ends over firm bearing.
1. Use sheathing H clips between roof framing members.
  2. Nail panels to framing; staples are not permitted.

### **3.5 SITE APPLIED WOOD TREATMENT**

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

### **3.6 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION

## SECTION 06192

### FABRICATED WOOD TRUSSES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

A. This Section includes the following:

1. Dual pitch single span trusses.
2. Gable end units.

##### 1.2 DEFINITIONS

A. Prefabricated metal-plate-connected wood trusses include planar structural units consisting of metal-plate-connected members that are fabricated from dimension lumber and that have been cut and assembled prior to delivery to the project site.

##### 1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Shop drawings indicating species, species group, sizes, and stress grades of lumber to be used; pitch, span, camber, configuration, and spacing for each type of truss required; type, size, material, finish, design values, and location of metal connector plates; bearing details; layout and details of all permanent bridging and bracing required to make up a complete roof framing system ready for sheathing.

1. To the extent engineering design considerations are indicated as fabricator's responsibility, include design analysis indicating loading, assumed allowable stress, stress diagrams and calculations, and other information needed for review that have been signed and sealed by a qualified professional engineer responsible for their preparation.

##### 1.4 QUALITY ASSURANCE

A. TPI Standards: Comply with applicable requirements and recommendations of the following Truss Plate Institute (TPI) publications:

1. "Design Specification for Metal Plate Connected Wood Trusses.
2. "Design Specification for Metal Plate Connected Parallel Chord Wood Trusses."

3. "Commentary and Recommendations for Handling and Erecting Wood Trusses."
  4. "Commentary and Recommendations for Bracing Wood Trusses."
  5. "Quality Standard for Metal Plate Connected Wood Trusses."
- B. Connector Plate Manufacturer's Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality control procedures for manufacture of connector plates published in TPI "Quality Standard for Metal Connector Plate Manufacture."
- C. Wood Structural Design Standard: Comply with applicable requirements of N.F.P.A. "National Design Specification for Wood Construction."
- D. Single-Source Engineering Responsibility: Provide trusses engineered by the metal plate connector manufacturer to support superimposed dead and live loads indicated, with design approved and certified by a qualified professional engineer.
- E. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation of metal-plate-connected wood trusses similar to those of this Project and with a record of successful in-service performance.
- F. Fabricator's Qualifications: A firm that complies with the above requirements for quality control and is experienced in prefabricating metal-plate-connected wood trusses similar to those of this Project that have a record of successful in-service performance.
- G. Single Source Responsibility for Connector Plates: Provide metal connector plates from a single manufacturer.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Handle and store trusses with care and comply with manufacturer's instructions and TPI recommendations to avoid damage from bending, overturning, or other cause which trusses are not designed to resist or endure.

## **1.6 SEQUENCING AND SCHEDULING**

- A. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying work of other trades whose work must follow erection of trusses.

## **PART 2 - PRODUCTS**



## **2.1 CONNECTOR PLATE MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering metal connector plates that may be incorporated in the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide metal connector plates by one of the following:
  - 1. Alpine Engineered Products, Inc.
  - 2. Bemax of Florida, Inc.
  - 3. Clary Corporation.
  - 4. Computrus, Inc.
  - 5. Gang-Nail Systems, Inc.
  - 6. Hydro-Air Engineering, Inc.
  - 7. Inter-Lock Steel Co., Inc.
  - 8. Metal-Lock, Inc.
  - 9. Robbins Manufacturing Co.
  - 10. TEE-Lok Corp.
  - 11. Truss Connectors of America.
  - 12. Truswal Systems Corporation.

## **2.2 LUMBER**

- A. Factory mark each piece of lumber with type, grade, mill, and grading agency.
- B. Inspection Agencies: Inspection agencies and the abbreviations used to reference them to lumber grades and species include the following:
  - 1. SPIB - Southern Pine Inspection Bureau.
  - 2. WCLIB - West Coast Lumber Inspection Bureau.
  - 3. WWPA - Western Wood Products Association.
- C. Nominal sizes are indicated, except as shown by detail dimensions.
  - 1. Moisture Content: Seasoned, with 15 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

## **2.3 METAL CONNECTOR PLATES**

- A. General: Fabricate connector plates from metal complying with requirements indicated in this article.
- B. Hot-Dip Galvanized Steel Sheet: Structural (physical) quality steel sheet

complying with ASTM A 446, Grade A; zinc coated by hot-dip process to comply with ASTM A 525, Designation G60; minimum coated metal thickness indicated but not less than 0.036 inch.

- C. Electrolytic Zinc-Coated Steel Sheet: Structural (physical quality steel sheet complying with ASTM A 591, Coating Class C, and, for structural properties, with ASTM A 446, Grade A; zinc coated by electro-deposition; with minimum coated metal thickness indicated but not less than 0.047 inch.
- D. Aluminum-Zinc Alloy-Coated Steel Sheet: Structural (physical) quality steel sheet complying with ASTM A 792, Coating Designation AZ 50, and, for structural properties, with ASTM A 446, Grade A; aluminum-zinc alloy-coated by hot-dip process; with minimum coated metal thickness indicated but not less than 0.036 inch.

## **2.4 FASTENERS**

- A. Nails, Wire, Brads, and Staples: FS FF-N-105.
- B. Power Driven Fasteners: National Evaluation Report NER-272.
- C. Wood Screws: ANSI B18.6.1.
- D. Lag Bolts: ANSI B18.2.1.
- E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

## **2.7 FABRICATION**

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints with wood-to-wood bearing in assembled units.
- B. Fabricate metal connector plates to size, configuration, thickness, and anchorage details required to withstand design loadings for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances specified in TPI "Quality Standard for Metal Plate Connected Wood Trusses." Position members to produce design camber indicated.
- D. Connect truss members by means of metal connector plates accurately located and securely fastened to each side of wood members by means indicated or approved.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General: Erect and brace trusses to comply with applicable requirements of referenced TPI standards.
- B. Where trusses do not fit, return them to fabricator and replace with trusses of correct size; do not alter trusses in the field.
- C. Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately at design spacings indicated.
- D. Hoist trusses in place by means of lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- E. Anchor trusses securely at all bearing points to comply with methods and details indicated.
- F. Install permanent all bridging and bracing as shown on the truss manufacturer's layouts, details, and written instructions.
- G. Do not cut or remove truss members.

END OF SECTION

**SECTION 06600**  
**SOLID PLASTIC FABRICATIONS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Solid plastic window sills.

**1.2 SUBMITTALS**

- A. See Section 01300 - Submittals for submittal procedures.
- B. Product Data: Materials and details of design and construction,
- C. Samples: Provide actual color samples for selection by Architect.

**PART 2 PRODUCTS**

**2.1 SOLID PLASTIC SILLS**

- A. 1/2 inch thick 100 percent acrylic polymer.
- B. Molding: Solid Surface material matching color of counter top.
- C. Colors: As selected by Architect from Manufacturer's standard solid colors.
- D. Manufacturers. .
  - 1. 'Genesis' Series Corian by DuPont Co, Wilmington, DE.
  - 2. LG Hi-Macs Solid Surfacing by LG Solid Source LLC, Peoria, AZ
  - 3. Staron Solid Surfacing by Cheil Industries / Samsung Chemical USA, La Mirada, CA.
  - 4. 'Gibraltar Solid Surface' by Wilsonart International Inc, Temple, TX
  - 5. Or equivalent.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- A. Verify existing conditions before starting work.

**3.2 INSTALLATION**

- A. Install in accordance with manufacturer's published instructions.

END OF SECTION

## **DIVISION 7 – THERMAL AND MOISTURE PROTECTION**

### **SECTION 07160**

#### **BITUMINOUS DAMPPROOFING**

##### **PART 1 GENERAL**

###### **1.1 SUMMARY**

- A. Section Includes: Cold-applied asphalt dampproofing.

###### **1.2 SUBMITTALS**

- A. General: Submit in accordance with Conditions of the Contract and requirements of Section 01300 "Submittals".
- B. Product data for each type of product specified, including data substantiating that materials comply with requirements for each dampproofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.
- C. Certification by dampproofing manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

###### **1.3 QUALITY ASSURANCE**

- A. Single-Source Responsibility: Obtain primary dampproofing materials and primers from one source and by a single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

###### **1.4 PROJECT CONDITIONS**

- A. Substrate: Proceed with dampproofing only after substrate construction and penetrating work have been completed.
- B. Weather Limitations: Proceed with dampproofing only when existing and forecasted weather conditions will permit work to be performed according to manufacturer's recommendations and warranty requirements.

##### **PART 2 PRODUCTS**

###### **2.1 BITUMINOUS DAMPPROOFING**

- A. Subject to compliance with specified requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to:

1. Cold-Applied, Asphalt Emulsion Dampproofing:

- a. Fibered Asphalt Emulsion Damp Proofing, Henry
- b. Fiber Emulsion Dampproofing, Karnak Chemical Corporation.
- c. Sealmatic Emulsion W.R. Meadows, Inc.

B. Cold-Applied, Asphalt Emulsion Dampproofing: Asphalt-based water emulsions recommended by the manufacturer for dampproofing use when applied according to the manufacturer's instructions. Do not use cut-back (solvent-based) products.

C. Comply with ASTM D1187, Type 1 and D1227 Type II.

## **2.2 MISCELLANEOUS MATERIALS**

A. Primer: Asphalt primer complying with ASTM D 41, for asphalt-based dampproofing.

B. Glass Fabric: Woven glass fabric, treated with asphalt, complying with ASTM D 1668, Type I.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

A. Clean substrate of projections and substances detrimental to work; comply with recommendations of prime materials manufacturer.

B. Install cant strips and similar accessories as recommended by prime materials manufacturer.

C. Fill voids and seal joints as recommended by prime materials manufacturer, with particular attention at construction joints.

D. Prime substrate as recommended by prime materials manufacturer.

E. Protection of Other Work: Do not allow liquid and mastic compounds to enter and clog drains and conductors. Prevent spillage and migration onto other surfaces of work by masking or otherwise protecting adjoining work.

### **3.2 INSTALLATION, GENERAL**

A. Comply with manufacturer's recommendations except where more stringent requirements are indicated and where Project conditions require extra precautions to ensure satisfactory performance of work.

- B. Reinforcement: At changes in plane install lapped course of glass fabric in first coat of dampproofing compound before it thickens.
- C. Apply vertical dampproofing down walls from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches (150 mm) over outside face of footing. Extend 12 inches (300 mm) onto intersecting walls and footings, but do not extend onto surfaces exposed to view when the Project is completed.
- D. Brush or spray apply a coat of asphalt emulsion dampproofing at a rate of 5 gal./100 sq. ft., to produce a uniform, dry-film thickness of not less than 30 mils

### **3.3 PROTECTION AND CLEANING**

- A. Protect exterior, below-grade dampproofing membrane from damage until backfill is completed. Remove overspray and spilled materials from surfaces not intended to receive dampproofing.

### **3.4 SCHEDULE**

- A. Locations: Apply dampproofing to the following surfaces.
  1. Exterior, below-grade surfaces of exterior concrete or masonry walls in contact with earth or other backfill.
  2. Where indicated on the Drawings.

END OF SECTION

## SECTION 07210

### FIBERGLASS BATT INSULATION

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following:
1. Batt Insulation: Fiberglass for attic.
  2. Sound Insulation: Fiberglass for stud walls
  3. Attic baffle vents

##### 1.2 SUBMITTALS

- A. Product data for each type of insulation specified.

##### 1.3 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 recommendations for handling, storage, and protection during installation.

#### PART 2 PRODUCTS

##### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:
1. Glass Fiber Insulation:
    - a. CertainTeed Corporation
    - b. Manville Building Insulations Division, Manville Sales Corp.
    - c. Owens/Corning Fiberglas Corp.

##### 2.2 INSULATING MATERIALS

- A. Faced Glass Fiber Blanket/Batt Insulation: R as indicated, thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type III, Class A (blankets with reflective vapor-retarder membrane facing with flame spread of 25 or less); foil-scrim-kraft or foil-scrim-polyethylene vapor-retarder membrane on one face with fibers manufactured from glass.



## **2.3 SOUND INSULATION**

- A. Comply with ASTM C 665 Type 1, un-faced fiber sound attenuation batts.

## **2.4 ATTIC BAFFLE VENTS**

- A. 22 inches by 40 inch minimum length plastic venting system to maintain air flow from soffits to ridge vents.

# **PART 3 EXECUTION**

## **3.1 INSTALLATION, GENERAL**

- A. Comply with insulation manufacturer's instructions applicable to products and application indicated.
- B. Extend insulation full thickness as 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.
- C. Install batt insulation with facing toward the interior and between each rafter.
- D. Install baffle vents between rafters in an attic to provide an unobstructed air channel through insulation to help keep air flowing from soffits to ridge vents.

## **3.2 PROTECTION**

- A. General: Protect installed insulation and vapor retarders from damage due to physical abuse, and other causes.

END OF SECTION

## SECTION 07220

### RIGID INSULATION

#### PART 1 GENERAL

##### 1.1 SUMMARY

A. Section includes:

1. Subgrade exterior insulation: Extruded polystyrene.
2. Perimeter insulation: Extruded polystyrene.
3. Insulating sheathing: Extruded polystyrene.

##### 1.2 RELATED SECTIONS

A. Related Sections: Sections containing requirements that relate to this Section include, but are not necessarily limited to:

1. Division 3, Section 03300 "Cast-in-Place Concrete".
2. Division 4, Section 04200 "Unit Masonry": masonry veneer.
3. Division 7, Section 07210 "Fiberglass Batt Insulation."
4. Division 7, Section 07230 "Foam-In-Place Insulation."

##### 1.3 DEFINITIONS

A. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "R-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

##### 1.4 SUBMITTALS

A. General: Submit the following items in accordance with the Conditions of the Contract and the requirements of Division 1 Specification Sections.

B. Product data for each type of insulation product specified.

##### 1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original, sealed wrapping, bearing manufacturer's name and brand designation, specification number, type, grade and R-value.

- B. 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 recommendations for handling, storage, and protection during installation.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with specified requirements, manufacturers offering insulation products that may be incorporated in the work include, but are not limited to, the following:
  - 1. Extruded Polystyrene Board Insulation:
    - a. Amoco Foam Products Co.
    - b. DiversiFoam Products.
    - c. The Dow Chemical Company.
    - d. Owens Corning Corp

### **2.2 INSULATING MATERIALS**

- A. Subgrade Exterior Insulation:
  - 1. Extruded Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation with closed-cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 Type IV; with 5-year aged R-value of 5.0 per inch at 75 deg F per ASTM C518, 24" wide.
  - 2. Provide insulation in thickness necessary to achieve R-values indicated.
- B. Insulating Sheathing for Metal Stud:
  - 1. Extruded Polystyrene Board Insulation T & G: Rigid, cellular polystyrene thermal insulation with closed-cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 Type IV; with 5-year aged R-value of 5.0 per inch at 75 deg F per ASTM C518, 48" wide, Owens Corning Foamular or equivalent.
  - 2. Provide insulation in thickness necessary to achieve R-values indicated.

### **2.3 INSULATION ACCESSORIES**

- A. Construction Tape: 0.003 inch thick polypropylene backing with acrylic adhesive, Owens Corning BILD-R-TAPE or equivalent.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and conditions with installer present, for compliance with requirements of the sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders.

### **3.3 INSTALLATION OF INSULATING MATERIALS**

- A. Comply with insulation manufacturer's instructions applicable to products and application indicated. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.
- B. Extend insulation full thickness as 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.
- C. Apply a single layer of insulation of required thickness, unless otherwise indicated or required to make up total thickness.
- D. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or mechanically fasten with masonry nails, asphalt roof cement, or clips to provide permanent placement and support of units.

### **3.4 INSULATED SHEATHING METAL STUD WALLS**

- A. Install panels horizontally with tongue up. Ensure that all vertical edges are centered over metal studs.
- B. Anchor to studs with galvanized self drilling, self tapping screws with a 1 inch diameter steel or plastic washer, spaced 12 inches on center vertically and 16 inches on center horizontally.
- C. Install construction tape over all joints. Center tape over joint.

### **3.5 PROTECTION**

- A. General: Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

## SECTION 07230

### FOAM-IN-PLACE INSULATION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

A. Section Includes:

1. Open-cell spray polyurethane foam for metal stud insulation.

##### 1.2 SUBMITTALS

- A. General: Submit in accordance with Conditions of the Contract and requirements of Section 01300 "Submittals".
- B. Product Data: Provide product data including thermal performance for foam, fire resistance and installer qualifications.

##### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer. Any repairs by a manufacture's licensed contractor.
- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- C. Fire Resistance Characteristics: As determined by testing identical products (based on a 4 inch minimum thickness) according to ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect spray polyurethane foam components as follows:
1. Component A and B: store between 60 degrees F and 90 degrees F
  2. Component B can be frozen but must be protected from overheating over 120 degree F and prolonged storage over 100 degree.
  3. Component B: mix thoroughly prior to use.
  4. Components should be a matched set (system) as supplied by the manufacturer.
  5. Use components within their labeled shelf-life.
  6. Use components as supplied with no site alterations or additions.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE CHARACTERISTICS**

- A. Air Material Air Leakage Rate: Maximum material air leakage rate of less than 0.004 cfm/ft<sup>2</sup> under a pressure differential of 0.3 in w.g. (1.6 psf) per ASTM E 2178 or E 282.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Development Index: 450 or less.

### **2.2 OPEN-CELL SPRAY POLYURETHANE FOAM**

- A. Open-Cell Spray Polyurethane Foam: Spray-applied polyurethane foam using water as a blowing agent. Minimum density of 0.5 lb/cu. ft. (8.0 kg/cu. m) and minimum aged R-value at 1-inch (25.4-mm) thickness of 3.7 deg F x h x sq. ft./Btu at 75 deg F (0.65 K x sq. m/W at 24 deg C).
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Icynene Inc.; Icynene Classic or comparable product by one of the following:
    - a. BASF Corporation.
    - b. Bayer Material Science (Bay Systems)
    - c. Handi-Foam

### **2.3 MISCELLANEOUS MATERIALS**

- A. Primer: Material recommended by insulation manufacturer where required for adhesion of insulation to substrates.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Verify that substrates are clean, dry, and free of substances that are harmful to insulation.
- B. Priming: Prime substrates where recommended by insulation manufacturer. Apply primer to comply with insulation manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

### **3.2 INSTALLATION**

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Spray insulation to envelop entire area to be insulated and fill voids.
- C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.
- D. Do not apply insulation within 3-inches of heat emitting devices or where the temperature is in excess of 200 degrees F, as per ASTM C411 or in accordance with applicable codes.
- E. Framed Construction: Install into cavities formed by framing members to achieve thickness indicated on drawings.
- F. Miscellaneous Voids: Apply according to manufacturer's written instructions.

### **3.3 PROTECTION**

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Thermal Protection: Protect installed spray polyurethane foam insulation with qualified thermal or ignition barrier per applicable building codes.

END OF SECTION



## **SECTION 07310**

### **SHINGLES**

#### **PART 1 - GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Granular surfaced fiberglass shingle roofing.
- B. Moisture shedding underlayment, eave, and ridge protection.

##### **1.2 RELATED SECTIONS**

- A. Section 06100 "Carpentry" for wood sheathing.

##### **1.3 REFERENCES**

- A. ANSI/ASTM D3462 – Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced Mineral Granules
- B. ASTM D4586 - Asbestos Free Roofing Cement.
- C. ASTM D7158 – Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)
- D. NRCA - Steep Roofing Manual.
- E. UL 790 - Tests for Fire Resistance of Roof Covering Materials.

##### **1.4 SUBMITTALS**

- A. General: Submit each item in this Article as required by Section 01300 Submittals.
- B. Product Data: Provide data indicating material characteristics, performance criteria, limitations and warranty.
- C. Samples for initial selection in the form of manufacturer's sample finishes showing the full range of colors and profiles available for each type of shingle indicated.
- D. Manufacturer's Installation Instructions: Indicate preparation required and installation procedures.

## **1.5 QUALITY ASSURANCE**

- A. Perform Work in accordance with NRCA Steep Roofing Manual.

## **1.6 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for ASTM D 3462 UL 790 fire resistance, and ASTM D7158 wind uplift testing for shingle types specified. Basic wind speed shall be as indicated on structural drawings.

## **1.7 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install eave edge protection and shingles when ambient temperatures are below 40 degrees F.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to Project site in manufacturer's unopened bundles or containers with labels intact.
- B. Handle and store materials at Project site to prevent water damage, staining, or other physical damage. Store roll goods on end. Comply with manufacturer's recommendations for job-site storage, handling, and protection.

## **1.9 PROJECT CONDITIONS**

- A. Weather Limitations: Proceed with installing asphalt shingles only when existing and forecasted weather conditions will permit work to be performed according to manufacturer's recommendations and warranty requirements, and when substrate is completely dry.

## **1.10 EXTRA MATERIALS**

- A. Furnish under provisions of Section 01700.
- B. Provide 5 bundles of extra shingles of the same color lot as installed.
- C. Provide 1 bundle of extra ridge shingles.

## **PART 2 - PRODUCTS**

## **2.1 ASPHALT SHINGLES**

A. Shingles: ASTM D3462, Class A, Type I - Self Sealing, mineral surfaced, architectural, glass fiber mat base; wind resistance testing to comply with ASTM D 7158; 40 year minimum commercial warranty, minimum weight of 260 lbs. per square, color selected by Architect

1. Manufacturers: Subject to compliance with requirements, provide asphalt shingles produced by one of the following:

- a. CertainTeed Corporation.
- b. GAF Building Materials Corporation.
- d. Tamko Asphalt Products, Inc.

B. Ridge Caps: Pre-manufactured type as recommended by the shingle manufacturer, color and finish to match shingles.

## **2.2 SHEET MATERIALS**

A. Underlayment: ANSI/ASTM D226, No. 30 unperforated asphalt saturated felts as recommended for use in waterproofing and in construction of shingle roofs. Synthetic polymer underlayment may be used as a substitute provided it is approved by the shingle manufacturer for use under their shingles.

B. Ice Dam Protection: Minimum 40-mil-thick, self-adhering, polymer-modified, bituminous sheet membrane, complying with ASTM D 1970. Provide primer when recommended by underlayment manufacturer.

## **2.3 ACCESSORIES**

A. Nails: Standard round wire shingle type, hot dipped zinc coated steel minimum 13/64 inch head diameter and 0.080 inch shank diameter, of sufficient length to penetrate 3/4 inch into roof sheathing.

B. Asbestos Free Cement: ASTM D4586, asphalt type with mineral fiber components, free of toxic solvents, capable of setting within 24 hours at temperatures of 75 degrees F and 50 percent RH.

C. Lap Cement: Fibrated cutback asphalt type, recommended for use in application of underlayment, free of toxic solvents and free of asbestos.

D. Vent Flashing Boots: Manufacturer's standard PVC unit with resilient opening sized for the penetrating pipe.

- E. Metal Drip Edge: Brake-formed prefinished aluminum sheet metal with at least a 2-inch roof deck flange and a 1-1/2-inch fascia flange with a 3/8-inch drip at lower edge. Color to match gutters.
- F. Expansion Clamps for Flashing Boots: Stainless steel, 1/2" minimum band width.
- G. Gutter: Formed 0.032-inch aluminum, nominal 5 inch by 3 3/4 inch ogee, finished same as fascia. Provide 1/4 inch by 1 1/2 inch gutter hangers at 3 foot centers.
- H. Downspout: Formed 0.027-inch aluminum finished to match gutter. Anchor with u-shaped hemmed straps 1/16 inch by 1 inch of same material and finish as downspout. Provide minimum of 3 per downspout.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that roof penetrations and plumbing stacks are flashed to deck surface.
- B. Verify that sheathing is solid, stable, and free of deterioration.
- C. Verify deck surfaces are dry, free of ridges, warps, or voids greater than 1/2 inch wide.

### **3.2 PREPARATION**

- A. Broom clean deck surfaces.

### **3.3 INSTALLATION - EAVE ICE DAM PROTECTION**

- A. Place eave edge and rake edge metal flashings tight with fascia boards or edge of sheathing if there is no fascia. Weather lap joints 2 inches and seal. Secure flange with nails spaced 8 inches o.c.
- B. Apply eave ice dam protection in accordance with manufacturer's instructions.
- C. Extend eave protection membrane minimum 2 ft upslope beyond interior face of exterior wall.

### **3.4 INSTALLATION - PROTECTIVE UNDERLAYMENT**

- A. Place one ply of underlayment over area not protected by eave protection, with ends and edges weather lapped minimum 6 inches. Stagger end laps of each consecutive layer. Nail in place.

- B. Install protective underlayment perpendicular to slope of roof and weather lap minimum 2 inches over eave protection.
- C. Weather lap and seal watertight with plastic cement, items projecting through or mounted on roof.

### **3.5 INSTALLATION -VENT FLASHING**

- A. Flash and seal work projecting through or mounted on roofing with plastic cement, weather tight.
- B. Secure vent flashing boots in place as the work progresses. Secure top of rubber flashing to vent with expansion clamp and apply continuous bead of sealant.

### **3.6 INSTALLATION - FIBERGLASS SHINGLES**

- A. Install shingles in accordance with manufacturer's instructions.
- B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce triple thickness over full roof area. Provide double course of shingles at eaves.
- C. Project first course of shingles 3/4 inch beyond eave drip edge.
- D. Extend shingles 1/2 inch beyond face of rake drip edge.
- E. Cap ridges with individual shingles, maintaining 5 inch weather exposure. Place to avoid exposed nails. Orient direction of shingles toward down wind direction of prevailing winds.
- F. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counterflashings.
- G. Complete installation to provide weather tight service.

### **3.7 PROTECTION OF FINISHED WORK**

- A. Do not permit traffic over finished roof surface.

END OF SECTION

## SECTION 07457

### CEMENTITIOUS PANELS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Exterior wall panels and battens
- B. Perforated soffits
- C. Miscellaneous trim

##### 1.2 RELATED SECTIONS

- A. Section 06100 - Carpentry: Wood framing and bracing.
- B. Section 06100 - Carpentry: Sheathing.
- C. Section 07220 – Rigid Insulation: Exterior wall insulation.

##### 1.3 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 3. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
  - 4. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
  - 5. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
  - 6. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure.
- B. AATCC127 - Water Resistance: Hydrostatic Pressure Test.
- C. TAPPI - T460 - Air Resistance of Paper (Gurley Method).

##### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Installation instructions and recommendations.

2. Storage and handling requirements and recommendations.
  3. Manufacturer's best practice guide.
  4. Technical data sheet.
- C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cladding junctions and penetrations which are outside the scope of the standard details and specifications provided by the manufacturer.
- D. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product and patterns.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## **1.6 PROJECT CONDITIONS**

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

## **1.7 WARRANTY**

- A. Manufacturer's Warranty:
1. Limited Product Warranty, with minimum 30-year limited product warranty against manufacturing defects. Minimum 15 years for trim.
  2. Application Warranty: Application limited warranty for 2 years.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
1. James Hardie Building Products, Inc.,
  2. Allura USA, by Plycem
  3. WeathereBoard Fiber Cement Siding by Certainteed

### **2.2 CLADDING**

- A. Code Compliance Requirement for Siding Materials:
1. Fiber-cement siding, complies with ASTM C 1186 Type A Grade II.

2. Fiber-cement siding, complies with ASTM E 136 as a noncombustible material.
3. Fiber-cement siding, complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
4. Fiber-cement siding, complies with ASTM E 119 1 hour and 2 hour fire resistive assemblies listed with Warnock Hersey.
5. Manufacturer's Technical Data Sheet.

## **2.3 WEATHER BARRIER**

- A. Code Compliance Requirement for Weather Barrier:
  1. Thickness, 11 mil sheet.
  2. Breathability in accordance with ASTM E96.
  3. Tear strength in accordance with ASTM D1117.
  4. Water resistance in accordance with AATCC127.
  5. Air Penetration in accordance with TAPPI - T460.

## **2.4 ACCESSORIES**

- A. Trims: All trims are to be full length but in no case less than two feet long.
- B. Ventilated Soffits:
  1. Manufacturer's standard perforated panels, with perforations the full width of the soffit.
- C. Size as indicated
  1. Horizontal trim.
  2. Vertical trim.
  3. Outside corner trim.
  4. Inside corner trim.
  5. Drip cap trim.

## **2.5 FASTENERS**

- A. Fasteners:
  1. Steel Framing: 10-12 1-1/2 inch long x 0.47 inch HD low profile Torx (T20W) (TW-S-D12-4.8x38).
  2. Fasteners shall be of high quality stainless steel to ensure resistance to corrosion. For field painting, fasteners shall be treated to accept paint adhesion.
  3. Alternatives must be approved by the architect. e.g. decorative screws, nails, bugle head screws, etc.

## **2.6 FINISHES**

- A. Factory Primer: Provide factory applied universal primer.
  1. Primer: Factory applied sealer/primer by manufacturer. Apply flat sheen finishes to panels.
  2. Topcoat: Refer to Section 09900 Field Painting.



## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

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

### **3.2 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Ensure that substrate is in intact and all penetrations are sealed. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.

### **3.3 INSTALLATION**

- A. Panel Installation: Install materials in strict accordance with manufacturer's installation instructions.
  - 1. Place fasteners no closer than 3/4 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
  - 2. Use fasteners as specified in the manufacturer's installation instructions and as specified.
  - 3. Install panes such that there are no horizontal joints.. Factory primed edge shall always be used.
  - 4. Install a kickout flashing to deflect water away from the siding at the roof intersection.
  - 5. Install a self-adhering membrane on the wall before the subfascia and trim boards are nailed in place, and then install the kickout.
  - 6. Allow minimum vertical clearance between the bottom edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
  - 7. Specific framing and fastener requirements - refer to the applicable building code compliance reports.

### **3.4 FINISHING**

- A. Painting of factory primed siding and trim is specified in Section 09900 Painting.
- B. Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to used on project.

### **3.5 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

## SECTION 07920

### JOINT SEALANTS

#### PART 1 GENERAL

##### 1.1 SUMMARY

A. Section Includes:

1. Joint sealants for following locations:

a. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:

- 1) The intersections of various materials as indicated or required for a permanently watertight installation.
- 2) Joints between different materials where a precise fit can not be achieved.
- 3) Perimeter joints between frames of louvers and other materials.
- 4) Other joints as indicated.

b. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:

- 1) Perimeter joints of exterior openings where indicated.
- 2) Joints between different materials where a precise fit can not be achieved.
- 3) Other joints as indicated.

##### 1.2 REFERENCES

A. ASTM C 834: "Standard Specification for Latex Sealants."

B. ASTM C 920: "Standard Specification for Elastomeric Joint Sealants."

C. ASTM C 1193: "Standard Guide for Use of Joint Sealants."

##### 1.3 SUBMITTALS

A. General: Submit in accordance with Conditions of the Contract and requirements of Section 01300 "Submittals".

B. Product data for sealants and accessory materials specified.

C. Color Chips: Samples for color selection consisting of cured portions of actual sealant materials proposed for use.

## **1.4 SYSTEM PERFORMANCE REQUIREMENTS**

- A. Provide elastomeric joint sealants produced and installed to establish and maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.
- B. Provide joint sealants for interior applications produced and installed to establish and maintain water-resistant and airtight continuous seals without causing staining or deterioration of joint substrates.

## **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced installer who has completed joint sealant applications similar in material, design, and extent to that indicated for this Project that have resulted in construction with a record of successful in-service performance.
- B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

## **1.7 PROJECT CONDITIONS**

- A. Environmental Conditions: Do not proceed with installation of joint sealants under following conditions:
  - 1. Temperature Conditions: When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F.
  - 2. Wet Substrate: When joint substrates are wet.
  - 3. Joint Width Conditions: Where joint widths are less than allowed by joint sealant manufacturer for application indicated.
  - 4. Contaminants: Until contaminants capable of interfering with sealant adhesion are removed from joint substrates.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS, GENERAL**

- A. Compatibility: Provide joint sealants, joint fillers, 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.
- B. Colors: Manufacturer's standard colors selected by Architect.

### **2.2 ELASTOMERIC JOINT SEALANT**

- A. One part non sag polyurethane, ASTM C 920, Type S, Grade NS, Class 25; Pecora Dynatrol I, Sonneborn Sonolastic NP 1, or Tremco Dymonic.
  - 1. Use: Exterior non-traffic surfaces and interior joints subject to movement.

### **2.3 LATEX JOINT SEALANT**

- A. One-part, nonsag, mildew-resistant, paintable acrylic-emulsion sealant, ASTM C 834, that accommodates joint movement of not more than 5 percent in both extension and compression for a total of 10 percent; Pecora "AC-20," Sonneborn "Sonolac," Tremco "Acrylic Latex 834".
  - 1. Use: Interior joints not subject to movement nor in walking surfaces.

### **2.4 JOINT SEALANT BACKING**

- A. General: Provide nonstaining sealant backings compatible with joint substrates, sealants, primers and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-staining, non-waxing, non-extruding strips of flexible open-cell polyurethane foam, of size, shape, and density necessary to control sealant depth.
- C. Bond-Breaker Tape: Self-adhesive 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.

### **2.5 MISCELLANEOUS MATERIALS**

- A. Primer: Material recommended by joint sealant manufacturer for adhesion of sealant to joint substrates indicated.

- B. 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, formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. 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. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and following:
  1. 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.
  2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar 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 from cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
  3. Remove laitance and form release agents from concrete.
  4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

- C. 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.

### **3.3 INSTALLATION OF JOINT SEALANTS**

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Installation of Sealant Backings:
  - 1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the 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 joint fillers.
    - b. Do not stretch, twist, puncture, or tear joint fillers.
    - c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
- D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at same time sealant backings are installed.
- E. Tooling of Nonsag Sealants:
  - 1. Immediately after sealant application and prior to time skinning or curing begins, tool sealants 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. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

2. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or that are not approved by sealant manufacturer.

### **3.4 CLEANING**

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

### **3.5 PROTECTION AND REPAIR**

- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion.
- B. If, despite protection, damage or deterioration occurs, cut out and replace damaged or deteriorated joint sealants immediately so that installations with repaired areas are indistinguishable from original work.

END OF SECTION



## **DIVISION 8 – DOORS AND WINDOWS**

### **SECTION 08111**

#### **HOLLOW METAL DOORS AND FRAMES**

##### **PART 1 GENERAL**

###### **1.1 SUMMARY**

- A. This Section includes the following products manufactured in accordance with SDI Recommended Standards:
  - 1. Doors: Seamless, composite construction, standard steel doors for exterior location.
  - 2. Frames: Pressed welded steel frames for doors.
  - 3. Glass and glazing for doors.
  - 4. Provide factory primed doors and frames to be field painted.
- B. Painting primed doors and frames is specified in Division 9 Section "Painting."
- C. Hardware is specified in Division 8 Section "Door Hardware."

###### **1.2 SUBMITTALS**

- A. Product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, and finishes.
- B. Shop drawings showing fabrication and installation of standard steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
  - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

###### **1.3 QUALITY ASSURANCE**

- A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI A250.8/SDI-100 and as herein specified.

###### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Protect doors and frames during transit and job storage.

- B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:
  - 1. Ceco Company.
  - 2. Republic Corp.
  - 3. Pioneer Industries.
  - 4. Steelcraft Manufacturing Co.

### **2.2 MATERIALS**

- A. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.
- B. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, or drawing quality, ASTM A 642, hot dipped galvanized in accordance with ASTM A 525, with A60 or G60 coating designation, mill phosphatized.
- C. Supports and Anchors: Fabricate of not less than 18-gage sheet steel; galvanized where used with galvanized frames.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanize in compliance with ASTM A 153, Class C or D as applicable.
- E. Shop Applied Primer: Rust-inhibitive, complying with ANSI A 224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."

### **2.3 DOORS**

- A. Provide metal doors ANSI/SDI-A250.8 Level 2, Model 1 Full Flush, heavy-duty, insulated, minimum 18-gage galvanized steel faces for exterior with flush panels, both sides. Provide a U-factor of 0.61 or better.
- B. Stile and Rail Doors: Stiles and rails shall be a minimum of 0.053 inches in thickness and shall be galvanized steel. Door corners shall be mitered. Mitered

joints shall be internally reinforced, welded and ground smooth such that no miter joints appear on door faces.. Panel faces shall be flush with perimeter surfaces and shall be joined to abutting perimeter members by welding or permanent mechanical fastening..

## **2.4 FRAMES**

- A. Provide 16 gage metal frames for interior and exterior doors. Concealed fastenings, unless otherwise indicated. Fabricate with mitered and welded corners. Provide galvanized steel frames for exterior doors.
- B. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames.
- C. Plaster Guards: Provide minimum 26-gage steel plaster guards or mortar boxes at back of hardware cutouts.

## **2.5 GLASS**

- A. Interior - Single Safety Glazing: Non-fire-rated.
  - 1. Type: Fully tempered float glass.
  - 2. Tint: Clear.
  - 3. Thickness: 1/4 inch (6 mm).
- B. Exterior: Insulated
  - 1. Type: Fully tempered float glass.
  - 2. Tint: Clear.
  - 3. Thickness: 1 inch (6 mm).
  - 4. Thermal Performance: U factor – 0.77, SHGC – 0.40

## **2.6 FABRICATION**

- A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practical, fit and assemble units in manufacturer's plant.
  - 1. Internal Construction:
    - a. Exterior Doors: Manufacturer's standard polyurethane or polystyrene core.
  - 2. Clearances: Not more than 1/8 inch at jambs and heads. Not more than 3/4 inch at bottom.
- B. Fabricate exposed faces of doors and panels from only cold-rolled steel.
- C. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."

- D. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel.
- E. Fabricate head of doors, panels, and frames from galvanized sheet steel in accordance with SDI-112. Close top and bottom edges of doors as integral part of door construction or by addition of minimum 16-gage inverted steel channels.
- F. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- G. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware in accordance with final Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.
- H. Reinforce doors and frames scheduled to receive surface-applied hardware.
- I. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames," published by Door and Hardware Institute.
- J. Shop Painting: Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames," unless otherwise indicated.
- C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100.

### **3.2 ADJUST AND CLEAN**

- A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

**SECTION 08211**  
**FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Flush wood doors.

**1.2 RELATED SECTIONS**

- A. Section 0811 – Hollow Metal Doors and Frames
- B. Section 08710 – Door Hardware

**1.3 REFERENCES**

- A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada.
- B. WDMA NWWDA I.S.1-A - Architectural Wood Flush Doors; Window and Door Manufacturers Association (formerly NWWDA).

**1.4 SUBMITTALS**

- A. See Section 01300 - Submittals for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, and factory finishing criteria,
- D. Samples: Submit samples of door veneer, minimum 8 x 8 inch in size illustrating wood grain, stain color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special installation instructions.

**1.5 QUALITY ASSURANCE**

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.6 DELIVERY, STORAGE, AND PROTECTION**

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

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

## **1.7 PROJECT CONDITIONS**

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

## **1.8 WARRANTY**

- A. See Section 01700 – Project Closeout for additional warranty requirements.
- B. Provide warranty for the following term: Life of installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## **PART 2 PRODUCTS**

### **2.1 DOORS**

- A. All Doors: See drawings for locations and additional requirements.
  - 1. Quality Standard: WDMA I.S. 1-A, Custom Grade, Heavy Duty performance.
  - 2. Wood Veneer Faced Doors: 5-ply or 7-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
  - 1. Provide solid core doors at all locations.
  - 2. Wood veneer facing with factory transparent finish.

### **2.2 DOOR FACINGS**

- A. Wood Veneer Facing for Transparent Finish: Red oak, veneer grade as specified by quality standard, rotary cut, book veneer match, running assembly match; unless otherwise indicated.

### **2.3 ACCESSORIES**

- A. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersunk style screws.

### **2.4 DOOR CONSTRUCTION**

- A. Fabricate doors in accordance with door quality standard specified.
- B. Fit door edge trim to edge of stiles after applying veneer facing.
- C. Factory machine doors for hardware other than surface-mounted hardware, in

accordance with hardware requirements and dimensions.

- D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
  - 1. Exception: Doors to be field finished.
  - 2. Wood veneer facing with factory transparent finish.
- E. Provide edge clearances in accordance with AWI Quality Standards Illustrated Section 1700.
- F. Non-rated solid core to be Type (PC) particle board cores, piles and faces as indicated above.

## **2.5 FACTORY FINISHING - WOOD VENEER DOORS**

- A. Factory finish doors in accordance performance properties equivalent to TR-6 or OP-6 catalyzed polyurethane (WDMA) and system 10 (AWS). Final color, build and sheen shall be as selected by the architect from submitted samples.

## **2.6 GLASS**

- A. Type S-3 - Single Safety Glazing: Non-fire-rated.
  - 1. Type: Fully tempered float glass.
  - 2. Tint: Clear.
  - 3. Thickness: 1/4 inch (6 mm).

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

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

### **3.2 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

### **3.3 INSTALLATION TOLERANCES**

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for maximum diagonal distortion.

### **3.4 ADJUSTING**

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

END OF SECTION



## **SECTION 08565**

### **DOUBLE HUNG WINDOWS**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Double Hung windows complete with hardware, glazing, weather strip, insect screen, standard or specified anchors, trim and attachments.

##### **1.2 RELATED SECTIONS**

- A. Section 06600 – Solid Plastic Fabrications: Window sills.
- B. Section 07920 – Joint Sealants: Sill sealant and perimeter caulking

##### **1.3 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 1. C1036: Standard Specification for Flat Glass.
  - 2. E90-09: Standard Test Method for Laboratory Measurement of airborne Sound Transmission Loss of Building Partitions and Elements.
  - 3. E 283: Standard Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.
  - 4. E 330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Door by Uniform Static Air Pressure Difference.
  - 5. E 547: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
  - 6. E 2190: Standard Specification for Insulating Glass Unit Performance Evaluation.
  - 7. F 2090-10: Standard Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms.
- B. Insulating Glass Manufacturer's Alliance/Insulating Glass Certification Council (IGMA/IGCC)
- C. American Architectural Manufacturer's Association/Window and Door Manufacturer's Association/Canadian Standards Association (AAMA/WDMA/CSA):
  - 8. AAMA/WDMA/CSA 101/I.S.2/A440-08: North American Fenestration Standard/Specification for windows, doors, and skylights.

9. AAMA/WDMA/CSA 101/I.S.2/A440-05: Standard/Specification for windows and unit skylights.
- D. Window and Door Manufacturer's Association (WDMA): Hallmark Certification Program.
- E. American Architectural Manufacturer's Association (AAMA): 624-10: Voluntary Specification, Performance Requirements and Test Procedures for Organic Coatings on Fiber Reinforced Thermoset Profiles.
- F. National Fenestration Rating Council (NFRC):
  1. 100: Procedures for Determining Fenestration Product U-factors
  2. 200: Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence.

#### **1.4 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings under provision of Section 01300
- B. Product Data: Submit catalog data.
- C. Specified performance and design requirements.
- D. Quality Control Submittals: Certificates: submit manufacturer's certification indicating compliance with specified performance and design

#### **1.5 STORAGE AND HANDLING**

- A. Deliver in original packaging and protect from weather
- B. Store window units in an upright position in a clean and dry storage area above ground to protect from weather.

#### **1.6 WARRANTY**

- A. Clear insulating glass with stainless steel spacers shall be warranted against seal failure caused by manufacturing defects and resulting in visible obstruction through the glass for twenty (20) years from the original date of purchase. Glass is warranted against stress cracks caused by manufacturing defects ten (10) years from the original date of purchase.
- B. Hardware and other non-glass components are warranted to be free from manufacturing defects for ten (10) years from the original date of purchase.

## **1.7 PERFORMANCE**

- A. Maximum U Factor: 0.33.
- B. SHGC: .40 or better
- C. Visual Transmittance: .62 minimum.
- D. Condensation Resistance: 55 - 56

## **PART 2 PRODUCTS**

### **2.1 FRAME DESCRIPTION**

- A. Interior: Pultruded reinforced fiberglass, 0.070 inch thick
- B. Frame width: Approximately 3 3/32 inches
- C. Jamb depth: 2 inches

### **2.2 SASH DESCRIPTION**

- A. Pultruded reinforced fiberglass 0.077 inch thick.
- B. Composite sash thickness: 15/16 inch
- C. Sash Options: Equal Sash
- D. Operating sash tilt to interior for cleaning or removal

### **2.3 GLAZING**

- A. Select quality complying with ASTM C 1036. Insulating glass SIGMA/IGCC when tested in accordance with ASTM E 2190. STC/OITC ratings are tested to the stated performance level in accordance with ASTM E 90-09.
- B. Glazing Method: Insulating glass
- C. Glass Type: Low E1, Argon gas to meet performance specifications
- D. Glazing Seal: Silicone bedding at exterior and a glazing boot to interior

### **2.4 FINISH**

- A. Exterior: Ultrex with a cross-head extruded acrylic organic coating system. Meets AAMA 624-10 requirements.

- B. Interior: Ultrex with a cross-head extruded acrylic organic coating system. Meets AAMA 624-10 and 00022716 requirements.
- C. Color: Stone White exterior with Stone White interior,

## **2.5 HARDWARE**

### **A. Balance System:**

- 1. Coil spring block and tackle with nylon cord, glass filled nylon shoe and zinc locking mechanism

### **B. Sash Lock:**

- 1. Zinc die cast contoured sash lift
- 2. Standard Color: White

### **C. Sash Lift:**

- 1. Zinc die cast contoured sash lift
- 2. Standard Color: White

### **D. Top and Bottom Tilt Latches: Ergonomic tilt latches attached to the upper corners of the top and bottom sash for easy tilting and sash removal**

## **2.6 WEATHER STRIP**

- A. At Bottom Sash: Combination foam filled bulb – Color: Beige
- B. At Top Sash: Combination hollow vinyl bulb – Color: Beige
- C. At Interlock: Rigid ABS with flexible hollow bulb – Color: Beige

## **2.7 INSECT SCREEN**

### **A. Factory-installed full screen**

- 1. Screen mesh: 18 by 16 – Charcoal fiberglass

### **B. Rolled form aluminum frame finish:**

- 2. Color: Stone White

## **2.8 ACCESSORIES AND TRIM**

### **A. Exterior Casing:**

1. Non-integral to the unit. Fastened to the exterior wall with barb and kerf.
2. Colors: Stone White.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verification of Condition: Before installation, verify openings are plumb, square and of proper dimensions. Report frame defects or unsuitable conditions before proceeding.
- B. Acceptance of Condition: Beginning installation confirms acceptance of existing conditions.

### **3.2 INSTALLATION**

- A. Assemble and install window/door unit(s) according to manufacturer's instruction and reviewed shop drawing.
- B. Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07920 Joint Sealants. Do not use expansive foam sealant.
- C. Install accessory items as required.

### **3.3 CLEANING**

- A. Remove visible labels and adhesive residue according to manufacturer's instruction.
- B. Leave windows and glass in a clean condition..

### **3.4 PROTECTING INSTALLED CONSTRUCTION**

- A. Protecting windows from damage by chemicals, solvents, paint or other construction operations that may cause damage.

END OF SECTION

## SECTION 08710

### DOOR HARDWARE

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Items known commercially as finish or door hardware that are required for swing doors.
- B. Related Sections: Sections containing requirements that relate to this Section include, but are not necessarily limited to:
  - 1. Division 8 Section "Steel Frames": Silencers integral with hollow metal frames.
  - 2. Division 8 Section "Flush Wood Doors."
  - 3. Division 8 Section "Automatic Door Operators."

##### 1.2 REFERENCES

- A. 2010 ADA Standards for Accessible Design – 9/15/2010 (2010 ASAD)
- B. ANSI/BHMA:
  - 1. A156.2: "Bored Locks & Latches".
  - 2. A156.4: "Door Controllers-Closers".
  - 3. A156.13: "Locks and Latches, Mortise".
  - 4. A156.16: "Auxiliary Hardware".
  - 5. A156.18: "Materials and Finishes."
- C. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

##### 1.3 SUBMITTALS

- A. General: Submit in accordance with Conditions of the Contract and requirements of Section 01300 "Submittals".
- B. Product Data: manufacturers' technical product data for each item of door hardware. Include installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Schedule: Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or

opening. Include:

- a. Type, style, function, size, and finish of each hardware item.
  - b. Name and manufacturer of each item.
  - c. Fastenings and other pertinent information.
  - d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
  - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
  - f. Mounting locations for hardware.
- D. Templates: For doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

#### **1.4 QUALITY ASSURANCE**

- A. Supplier Qualifications: Engage a recognized architectural door hardware supplier, with warehousing facilities in Project's vicinity, with a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project
- B. Hardware shall be suitable for use required and shall fit designated location. Should any hardware shown fail to meet requirements of intended use or require modification to suit or fit designated location, seek necessary modification in time to avoid delay in manufacture and delivery of hardware.
- C. Only labeled fire door hardware shall be used in conjunction with firer rated door assemblies.

#### **1.5 MAINTENANCE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

### **PART 2 PRODUCTS**

#### **2.1 SCHEDULED HARDWARE**

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at end of this Section. Included is hardware and controls for automatic door operators specified in Section 08780 Automatic Door Operators.

## **2.2 MATERIALS AND FABRICATION**

- A. Base Metals: Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units for finish designations indicated.
- B. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws.
- C. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
- D. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

## **2.3 HARDWARE FINISHES**

- A. Designations of hardware finishes are those listed in ANSI/BHMA A156.18.

## **2.4 HINGES**

- A. Type: 5-knuckle, full mortise bearing hinge, standard weight.
- B. Size: 4 ½" by 4 ½" ,
- C. Gauge: 0.134 inches.
- D. Material: Steel.
- E. Finish: ANSI/BHMA 626 (satin chromium plated).
- F. Templates: Provide only template-produced units.
- G. Screws: Phillips flat-head screws.
  - 1. For metal doors and frames install machine screws into drilled and tapped holes.



2. Finish screw heads to match surface of hinges or pivots.

H. Hinge Pins:

1. Tips: Flat button and matching plug, finished to match leaves.
2. Out Swing Exterior Doors: Provide non-removable pins.
3. Interior Doors: Non-rising pins.

## **2.5 LOCK CYLINDERS AND KEYING**

- A. Lock cylinders shall be 7 pin IC removable core
- B. Exterior doors to be keyed alike; interior doors to be keyed separately.

## **2.6 CLOSERS AND DOOR CONTROL DEVICES**

- A. General: Provide only adjustable, non-handed, non-sized units with full covers.
  1. Provide units complying with ASAD provisions for door opening force and delayed action closing.
  2. Coordinate requirements for automatic door operators.

## **2.7 FLUSH BOLTS**

- A. Minimum 12-inch-long rod for doors up to 7'-0" in height.
- B. Provide Ives 200 series for wood doors with matching dustproof strikes.

## **2.8 LOCKSETS AND LATCHSETS**

- A. Type: Cylindrical, ANSI A156.2, Series 4000, Grade 1, 2 ¾" backset.
- B. Lock Chassis: Stainless steel or zinc-dichromated steel, through-bolted.
- C. Latchbolt: Brass or stainless steel, ½" throw minimum.
- D. Lever Handles: Solid cast brass, bronze, or zinc, no plastic inserts, round or rectangular cross section, with free end returned to within ½" of door face. Handles shall have independent return springs to minimize lever sag.
- E. Escutcheon: Wrought, one piece, with no exposed fasteners.
- F. Finish: ANSI/BHMA 626 (satin chromium plated)
- G. Strikes: Manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.
- H. Function: As described in hardware schedule at end of this Section.

## **2.9 EXIT DEVICE**

- A. Pushbar rim type, ANSI A156.3, Type 1, Grade 1, surface applied, single latching point, BHMA 626.
- B. Provide dogging device to keep latch bolt retracted, when engaged.
- C. Exterior side to be provided with trim, cylinder lock, to match with other locksets.

## **2.10 KICKPLATES**

- A. Brushed or satin stainless steel, 0.050 inch thick, 8 inches high, width equal to door width less 2 inches, beveled four sides. Provide phillips-head sheet metal screws for attachment, finished to match kickplate.

## **2.11 STOPS**

- A. Wall-Mounted Stops: Approximately 1-3/4 inches in diameter and projecting one inch from wall, concealed fasteners, ANSI/BHMA 626 finish, rubber bumper. Bumper to have depression to account for lockset locking device.

## **2.12 PUSH AND PULL PLATES AND PULLS**

- A. Push and Pull Plates: Brushed or satin stainless steel 6 by 16 inches, 0.05 inch thick, ANSI A156.6. Provide phillips-head sheet metal screws for attachment, finished to match plates.
- B. Pull: 3/4 inch round stainless steel, 8 inches center to center.

## **2.13 WEATHERSTRIPPING**

- A. General: Provide continuous weatherstripping on exterior doors. Provide non-corrosive fasteners.

## **2.14 THRESHOLDS**

- A. General: Provide metal threshold of type, size, and profile scheduled.
  - 1. Provide units complying with 2010 ASAD provisions for height and edge bevel.
  - 2. Provide units formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames.

# **PART 3 EXECUTION**

## **3.1 INSTALLATION**

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations.

1. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
  2. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
  - C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
  - D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
  - E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.
  - F. Weatherstripping: Install so as to leave no gaps around door perimeter, with seals under slight compression when doors are closed.

### 3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
  1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

### 3.3 HARDWARE SCHEDULE

	Quantity	Description
Hardware Set '1'		
Door 101	1 ½ pr.	Hinges
	1	Closer and automatic door operator
	1	Exit device

	1	Push Plate & Pull
	2	Kickplate
	1	Threshold
	1 set	Weatherstripping
Hardware Set '2'		
Door 102	1 ½ pr.	Hinges
	1	Closer and automatic door operator
	1 set	Push plate and pull
	1	Kickplate
	1	Wall Stop
Hardware Set '3'		
Door 103	1 1/2 pr	Hinges
	1	Latchset: F75
Hardware Set '4'		
Doors 104, 105	1 ½ pr	Hinges
	1	Lockset: F82
	1	Kickplate
	1	Wall Stop
Hardware Set '5'		
Doors 106, 107	1 ½ pr	Hinges
	1	Closer
	1	Lockset: F76
	1	Kickplate
	1	Wall Stop
Hardware Set '6'		
Door 108	1 ½ pr	Hinges
	1	Closer
	1	Latchset: F75
	1	Kickplate
	1	Wall Stop
Hardware Set '8'		
Door 109	1 ½ pr	Hinges
	1	Closer
	1	Lockset: F82B
	1	Kickplate
	1 set	Weatherstripping
	1	Threshold
Hardware Set '7'		
Door 110	1 ½ pr	Hinges
	1	Latchset: F75
	1	Kickplate
	1	Wall Stop

END OF SECTION

## SECTION 08780

### AUTOMATIC DOOR OPERATORS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. This section specifies equipment, controls and accessories for automatic operation of swing doors.

##### 1.2 RELATED WORK

- A. Door hardware; Section 08710 Door Hardware.
- B. Electric general wiring, connections and equipment requirements; Division 16, Electrical.

##### 1.3 QUALITY ASSURANCE

- A. Automatic door operators, controls and other equipment shall be products of a manufacturer regularly engaged in manufacturing such equipment for a minimum of three years.
- B. One type of automatic door equipment shall be used throughout the building.
- C. Equipment installer shall have specialized experience and shall be approved by the manufacturer.

##### 1.4 WARRANTY

- A. Provide a two-year warranty against equipment and installation defects..

##### 1.5 SUBMITTALS

- A. Submit in accordance with Section 01300 Submittals
- B. Manufacturer's literature and data describing operators, power units, controls, door hardware and safety devices.
- C. Shop Drawings:
  - 1. Showing location of controls and safety devices in relationship to each automatically operated door.
  - 2. Showing layout, profiles, product components, including anchorage, accessories, as applicable.
  - 3. Submit templates, wiring diagrams, fabrication details and other information to coordinate the proper installation of the automatic door operators.
- D. At project closeout submit operating and maintenance manuals in accordance with Section 01730 Operation and Maintenance Manuals.

##### 1.6 DESIGN CRITERIA

- A. As a minimum automatic door equipment shall comply with the requirements of BHMA 156.10. Except as otherwise noted on drawings, provide operators which will move the doors from the fully closed to fully opened position in three seconds maximum time interval, when speed adjustment is at maximum setting.

- B. Equipment: Conforming to UL 325. Provide key operated power disconnect wall switch for each door installation.
- C. Electrical Wiring, Connections and Equipment: Provide all motor, starter, controls, associated devices, and interconnecting wiring required for the installation. Equipment and wiring shall be as specified in Division 16 ELECTRICAL. Wiring shall be concealed.

## **1.7 DELIVERY AND STORAGE**

- A. Delivery shall be in factory's original, unopened, undamaged container with identification labels attached.

## **PART 2 - PRODUCTS**

### **2.1 SWING DOOR OPERATORS**

- A. General: Swing door operators shall be of institutional type, door panel size 3 foot width, weight not to exceed 600 pounds, electric operated for overhead mounting within the header or transom. Furnish metal mounting supports, brackets and other accessories necessary for the installation of operators at the head of the door frames. The motor on automatic door operator shall be provided with an interlock so that the motor will not operate when doors are locked from opening.
- B. Operators shall have checking mechanism providing cushioning action at last part of door travel, in both opening and closing cycle. Operators shall be capable of recycling doors instantaneously to full open position from any point in the closing cycle when control switch is activated. Operators shall, when automatic power is interrupted or shut-off, permit doors to easily open manually without damage to automatic operator system.
- C. Operator, enclosed in housing, shall open door by energizing motor and shall stop by electrically reducing voltage and stalling motor against mechanical stop. Door shall close by means of spring energy, and close force shall be controlled by gear system and motor being used as dynamic break without power, or controlled by hydraulic closer in electro-hydraulic operators. System shall operate as manual door control in event of power failure. Opening and closing speeds shall be adjustable:
  - 1. Operator Housing: Housing shall be a minimum of 4-1/2 inches wide by 5.5 inches high aluminum extrusions with enclosed end caps for application to 4 inches and larger frame systems. All structural sections shall have a minimum thickness of 0.125 inches and be fabricated of a minimum of 6063-T5 aluminum alloy.
  - 2. Power Operator: Completely assembled and sealed unit which shall include gear drive transmission, mechanical spring and bearings, all located in aluminum case and filled with special lubricant for extreme temperature conditions. Complete unit shall be rubber mounted with provisions for easy maintenance and replacement, without removing door from pivots or frame.
  - 3. Connecting hardware shall have drive arm attached to door with a pin linkage rotating in a self-lubricating bearing. Door shall not pivot on shaft of operator.

4. Electrical Control: Operator shall have a self contained electrical control unit, including necessary transformers, relays, rectifiers, and other electronic components for proper operation and switching of power operator. All connecting harnesses shall have interlocking plugs.

## **2.2 MICROPROCESSOR CONTROLS**

- A. The system shall include a multi-function microprocessor control providing adjustable hold open time (1–30 seconds), LED indications for sensor input signals and operator status and power assist close options. Control shall be capable of receiving activation signals from any device with normally open dry contact output. All activation modes shall provide fully adjustable opening speed:
- B. The door shall be held open by low voltage applied to the continuous duty motor. The control shall include an adjustable safety circuit that monitors door operation and stops the opening direction of the door if an obstruction is sensed. The motor shall include a recycle feature that reopens the door if an obstruction is sensed at any point during the closing cycle. The control shall include a standard three position key switch with functions for ON, OFF, and HOLD OPEN, mounted on operator enclosure, door frame, or wall, as indicated in the architectural drawings.

## **2.3 POWER UNITS**

- A. Each power unit shall be self-contained, electric operated and independent of the door operator. Capacity and size of power circuits shall be in accordance with automatic door operator manufacturer's specifications and Division 16 Electrical.

## **2.4 DOOR CONTROLS**

- A. Opening and closing actions of doors shall be actuated by controls and safety devices specified, and conform to ANSI 156.10. Controls shall cause doors to open instantly when control device is actuated; hold doors in open positions; then, cause doors to close, unless safety device or reactivated control interrupts operation.
- C. Provide a set of individual controls for each door.
- B. Manual Controls:
  1. Wireless.
  2. Push Plate Wall Switch: Recess type, stainless steel push plate minimum 100 mm by 100 mm (four-inch by four-inch), with 13 mm (1/2-inch) high letters "To Operate Door--Push" engraved on face of plate.

# **PART 3 - EXECUTION**

## **3.1 INSTALLATION**

- A. Coordinate installation of equipment with other related work. Manual controls and power disconnect switches shall be recessed or semi-flush mounted in partitions. Secure operator components to adjacent construction with suitable fastenings. Conceal conduits, piping, and electric equipment, in finish work.

- B. Install power units in locations shown. Where units are to be mounted on walls, provide metal supports or shelves for the units. All equipment, including time delay switches, shall be accessible for maintenance and adjustment.
- C. Operators shall be adjusted and must function properly for the type of traffic expected to pass through doors.
- D. Install controls at positions shown and make them convenient for particular traffic expected to pass through openings. Maximum height of push plate wall switches from finished floors shall be 40 inches unless otherwise approved by the Architect.

### **3.2 INSTRUCTIONS**

- A. Following the installation and final adjustments of the door operators, the installer shall fully instruct VDOT personnel for minimum 1 hour on the operating, servicing and safety requirements for the swing automatic door operators.

END OF SECTION



## **DIVISION 9 - FINISHES**

### **SECTION 09260 GYPSUM BOARD ASSEMBLIES**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

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

##### **1.2 RELATED REQUIREMENTS**

- A. Section 06100 - Carpentry: Wood blocking product and execution requirements.
- B. Section 09900 – Field Painting

##### **1.3 REFERENCE STANDARDS**

- A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute ; 2001 with 2004 supplement. (replaced SG-971)
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process ; 2011.
- C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board ; 2002 (Reapproved 2007).
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members ; 2011a.
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products ; 2011.
- F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board ; 2011.
- G. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness ; 2011.
- H. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs ; 2007.
- I. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base ; 2010a.
- J. ASTM C1396/C1396M - Standard Specification for Gypsum Board ; 2011.

- K. ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction ; 2010.
- L. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association ; 2010.

## **PART 2 PRODUCTS**

### **2.1 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

### **2.2 METAL FRAMING MATERIALS**

- A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (240 Pa).
  - 1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
  - 2. Studs: "C" shaped with flat or formed webs with knurled faces.
  - 3. Runners: U shaped, sized to match studs.
- B. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
  - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
  - 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.

### **2.3 BOARD MATERIALS**

- A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Regular Type;
    - a. Application: Use for vertical surfaces, unless otherwise indicated.
    - b. Thickness: 5/8 inch.
    - c. Edges: Tapered
- B. Backerboard Behind Ceramic Tile: Cement fiber type.

### **2.4 ACCESSORIES**

- A. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.

1. Types: As detailed or required for finished appearance.
  2. Special Shapes: In addition to conventional cornerbead and control joints, provide LC-bead at exposed panel edges and panels abutting other construction.
- B. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
1. Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners , except as otherwise indicated.
  2. Ready-mixed vinyl-based joint compound.
- C. Screws: ASTM C1002; self-piercing tapping type. For fire-rated walls, provide length as required for the indicated rating.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

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

### **3.2 FRAMING INSTALLATION**

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Studs: Space studs at 24 inches (600 mm) on center.
1. Extend partition framing to structure in all locations.
  2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- D. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board. Secure in place on alternate channel flanges at maximum 24 inches (600 mm) on center.
1. Orientation: Vertical.
- E. Blocking: Install wood blocking for support of Wall Cabinets and Wall-Attached Items. Bolt or screw steel channels to studs.

### **3.4 BOARD INSTALLATION**

- A. Comply with ASTM C 840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

- C. Installation on Metal Framing: Use screws for attachment of all gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.
- D. Installation on Concrete Masonry Units: Use masonry fasteners for attachment. Space fasteners as recommended by gypsum board manufacturer for installation on metal framing.

### **3.5 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
  - 1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

### **3.6 JOINT TREATMENT**

- A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840 Level 4, except use Level 1 finish in concealed spaces above ceilings.
  - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  - 2. Level 2: Attic smoke barriers and concealed work above ceilings.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
  - 1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

### **3.7 TOLERANCES**

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

END OF SECTION

## **SECTION 09300**

### **CERAMIC TILE**

#### **PART 1 - GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Ceramic floor tile.
- B. Ceramic tile and base over fiber cement backerboard.

##### **1.2 REFERENCES**

- A. ANSI A118.4 - Latex-Portland Cement Mortar.
- B. ANSI A118.5 – Installation of Ceramic Tile with Dry-set Portland Cement Mortar or Latex Portland Cement Mortar
- C. ANSI A118.6 - Ceramic Tile Grouts.
- D. ANSI A137.1 - Standard Specifications for Ceramic Tile.
- E. TCNA (Tile Council of North America) - Handbook for Ceramic Tile, Glass, and Stone Tile Installation.

##### **1.3 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data: Provide for tile, grout, and mortar.
- C. Samples: Provide samples of specified tile and grout for color selection.
- D. Manufacturer's Certificate: Certify that products meet or exceed ANSI A137.1.

##### **1.4 MAINTENANCE DATA**

- A. Submit under provisions of Section 01730.
- B. Maintenance Data: Include recommended cleaning methods, cleaning materials and stain removal methods.

##### **1.5 QUALITY ASSURANCE**

- A. Materials are to be made in America.
- B. Perform Work in accordance with ANSI A137.1.

- C. Conform to TCNA Handbook.
- D. Maintain one copy of each document on site.

## **1.6 QUALIFICATIONS**

- A. Installer: Company with mechanics specializing in performing the work of this section with minimum three years documented experience.

## **1.7 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

## **1.8 EXTRA MATERIALS**

- A. Provide 4 sq ft of each size, color, and surface finish of tile specified.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Available manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to the following:
  - 1. American Olean
  - 2. Daltile
  - 3. Marazzi
- B. Colors and textures will be selected from the manufacturer's complete line of tiles with a maximum of 10 percent selected as accent tile.

### **2.2 CERAMIC TILE MATERIALS**

- A. Ceramic Floor Tile: ANSI A137.1, conforming to the following:
  - 1. Moisture Absorption:11 to 16 percent
  - 2. Size:1 x 1 x 1/4 inch
  - 3. Shape:square
  - 4. Edge:cushioned
  - 5. Surface Finish:slip-resistant
- B. Ceramic Wall Tile: ANSI A137.1, conforming to the following:
  - 1. Moisture Absorption:11 to 16 percent
  - 2. Size:4 1/4 x 4 1/4 x 5/16 inch

3. Shape:square
4. Edge:cushioned
5. Surface Finish:glazed

C. Ceramic Wall Tile Base: ANSI A137.1, conforming to the following:

1. Moisture Absorption:11 to 16 percent
2. Size:4 1/4 x 4 1/4 x 5/16 inch
3. Shape:square
4. Bottom Edgecoved
5. Top Edgecushioned
6. Internal Corner:coved
7. External Corner:bullnosed
8. Surface Finish:glazed

## **2.3 MORTAR MATERIALS**

A. Mortar Materials: ANSI A108.1A.

## **2.4 GROUT MATERIALS**

A. Grout: ANSI A118.6, Commercial Portland Cement Grout with a latex additive, color as selected.

## **2.5 MORTAR MIX AND GROUT MIX**

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturer's written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. 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 installation indicated.

## **2.6 THRESHOLDS**

- A. General: Provide marble thresholds of type, size, and profile scheduled.
  1. Provide units complying with 2010 ASAD provisions for height and edge bevel.
  2. Provide units formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. 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 the installed tile.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
  - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind the tile has been completed before installing tile.

### **3.2 PREPARATION**

- A. Protect surrounding work from damage or disfiguration.
- B. Remove coatings, oil, etc. from existing tile surfaces.
- C. Vacuum clean surfaces.
- D. Seal substrate surface cracks with filler.
- E. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.3 INSTALLATION -GENERAL**

- A. Comply with ANSI Tile Installation Standards and TCNA Installation Guidelines.
  - 1. For floor system, install in accordance with TCNA F-113 On-Ground Concrete Ceramic Tile.
  - 2. For wall system over concrete masonry, install in accordance with TCNA W-2021 Masonry or Concrete Ceramic Tile.
  - 3. For wall system over metal studs, install in accordance with TCNA W-243 Wood or Metal Studs Gypsum Board Cementitious Bond Coat Ceramic Tile.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignment.
- C. Accurately form intersections and returns. Perform cutting and drilling of the tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finis, 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.



- D. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints and make the same size, when adjoining tiles on base, walls, and trim. Lay out 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. Specific patterns with accent tile will be defined by the Architect.
- E. Grout tile to comply with the requirements of the following installation standards:
  - 1. For ceramic tile grouts: (sand-Portland cement, dry-set, commercial Portland cement, and latex-Portland cement grouts), comply with ANSI A108.10.

### **3.4 CLEANING**

- A. Clean tile and grout surfaces.

### **3.5 PROTECTION OF FINISHED WORK**

- A. Protect finished Work with plastic sheathing or similar covering.

END OF SECTION

**SECTION 09511**  
**ACOUSTICAL TILE CEILINGS**

**PART 1 GENERAL**

**1.1 SUMMARY**

A. Section Includes:

1. Ceilings composed of acoustical tiles and exposed suspension

**1.2 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of the Contract and requirements of Division 1 specification sections.
- B. Product data for each type of product specified.
- C. Samples for verification of each type of exposed finish required, prepared on samples of size indicated below. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
1. 6-inch square samples of acoustical panel type, pattern, and color.
  2. Set of 12-inch long samples of exposed suspension system members.

**1.3 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced installer who has completed acoustical tile ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver acoustical tiles and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

## **1.5 PROJECT CONDITIONS**

- A. Space Enclosure and Environmental Limitations: Do not install acoustical panel ceilings until work above ceilings is complete.
- B. All acoustical ceiling tile materials shall be classified in accordance with ASTM E84. Flame spread and smoke spread ratings of acoustical ceiling tile materials shall have a rating greater than Class III when tested in accordance with ASTM E84.

## **1.6 COORDINATION**

- A. Coordinate layout and installation of acoustical tiles and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, sprinkler heads, and HVAC equipment.

## **1.7 EXTRA MATERIALS**

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
  - 1. Acoustical Ceiling Units: Furnish quantity of full-size units of each tile provided equal to 2.0 percent of amount installed.

## **PART 2 PRODUCTS**

### **2.1 ACOUSTICAL TILES**

- A. Acoustical Panel Standard: Provide manufacturer's standard tiles of configuration specified that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.
  - 1. Mounting Method for Measuring Noise Reduction Coefficient (NRC):  
Type E-400 (plenum mounting in which face of test specimen is 15-3/4 inches [400 mm] away from the test surface) per ASTM E 795.
- B. Flame Spread and Smoke Development: Flame spread and smoke spread ratings of acoustical ceiling tile materials shall have a rating not greater than Class A when tested in accordance with ASTM E84.
- C. Acoustical Tile: 24 x 24 inch wet-formed mineral fiber with factory-applied vinyl latex paint finish.
  - 1. Color: White.
  - 2. Edge: Square.
  - 3. Thickness: 5/8".

4. NRC: 0.55.
5. Products:
  - a. Armstrong Sand Pebble
  - b. Celotex Cashmere.
  - c. USG Pebbled.

## **2.2 METAL SUSPENSION SYSTEMS, GENERAL**

- A. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
- B. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated.
- C. Attachment Devices: Size for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
  1. Zinc-Coated Carbon Steel Wire: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper.
  2. Size: Select wire diameter so that its stress at 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than the yield stress of wire, but provide not less than 0.106-inch diameter wire.
- E. Sheet-Metal Edge Moldings and Trim: Manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runner.

## **2.3 DIRECT HUNG SUSPENSION SYSTEMS**

- A. Suspension Systems: Wide-face, capped, double-wed, steel suspension system, main and cross runners roll formed from hot-dipped galvanized, cold-rolled steel sheet, with prefinished 15/16-inch-wide metal caps on flanges; other characteristics as follows:
  1. Structural Classification: Intermediate-duty system.
  2. End Condition of Cross Runners: Override (stepped) type.
  3. Cap Material and Finish: Aluminum sheet as standard with manufacturer, painted white.
  4. Available Products: Subject to compliance with requirements, suspension systems that may be incorporated in the Work include, but are not limited to, the following:
    - a. Prelude XL 15/16" Exposed Tee System; Armstrong World Industries, Inc.
    - b. Celogrid 700; Celotex, Inc.

- c. Donn ZXA; USG Interiors, Inc.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and 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. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Measure each ceiling area and establish the layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and conform to the layout shown on reflected ceiling plans.

### **3.3 INSTALLATION**

- A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's instructions and CISCA "Ceiling Systems Handbook."
  - 1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
  - 2. CISCA Recommendations for Acoustical Ceilings: Comply with CISCA "Recommendations for Direct-Hung Acoustical Tile and Lay-In Tile Ceilings."
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of the supporting structure or of the ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
  - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of 3 tight turns. Connect hangers either directly to structures or to inserts, eye screws, or other devices that are secure, that are appropriate for substrate, and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers; and provide hangers not more than 8 inches (200 mm) from ends of each member.
- C. Install edge moldings and trim of type specified at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical tiles.
    1. Screw attach moldings to substrate at intervals not over 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 (3.18 mm in 3.66 m). Miter corners accurately and connect securely.
    2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
  - D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
  - E. Install acoustical tiles with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut tiles at borders and penetrations to provide neat, precise fit.

### **3.4 CLEANING**

- A. Clean exposed surfaces of acoustical tile ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's 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.

END OF SECTION

**SECTION 09650**  
**RESILIENT FLOORING**

**PART 1 GENERAL**

**1.1 DESCRIPTION OF WORK**

- A. This Section includes the following:
1. Commercial grade vinyl composition tile
  2. Rubber base.

**1.2 SUBMITTALS**

- A. See Section 01300 – Submittals for submittal procedures
- B. Product data for each type of product specified.
- C. Samples for initial selection purposes consisting of actual tiles or sections of tiles showing full range of colors and patterns available for each type of resilient floor tile indicated.
- D. Maintenance data for products specified.

**1.3 QUALITY ASSURANCE**

- A. Single-Source Responsibility for Products: Obtain each type, color, and pattern of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Fire Performance Characteristics: Provide products with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648.
  2. Smoke Density: Less than 450 per ASTM E 662.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

- B. Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- C. Move products into spaces where they will be installed at least 48 hours in advance of installation. Store tiles on flat surfaces.

## **1.5 PROJECT CONDITIONS**

- A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).
- B. Do not install products until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during product installation.

## **1.6 SEQUENCING AND SCHEDULING**

- A. Install products specified in this Section after other finishing operations, including painting, have been completed.
- B. Do not install tiles over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive as determined by tile manufacturer's recommended bond and moisture test.

## **1.7 EXTRA MATERIALS**

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.
  - 1. Furnish not less than one box for each 50 boxes or fraction thereof, of each class, wearing surface, color, pattern and size of resilient floor tile installed.
  - 2. Furnish not less than 10 linear feet of each different type and color of resilient wall base provided.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. General: Flooring and base materials shall not be more than 6 months old at time of installation.
- B. Vinyl Composition Tile: 12 by 12 inches in size, 1/8 inch thick, thru-color Excelon Imperial Texture by Armstrong Flooring Company, Expressions by Tarkett, Inc., Custom Cortina by Azrock Floor Products, or equivalent.



- C. Rubber Base: Supply in 120-foot roll, 4 inches high, straight type cove type. Cove shall be not less than 1/2 inch in depth. Flexco, Marley Floors Inc.; Burke Mercer, Roppe Rubber Corporation, or equivalent.
- D. Vinyl Reducers: Tapered, solid vinyl strips in thickness required for tile.
- E. Accessories: Primer, cement, and adhesive of the type recommended by the manufacturer of the flooring, waterproof type unless otherwise recommended in specific cases by the manufacturer of the flooring.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Preparation of Subfloor: Surfaces to receive flooring shall be free from moisture, paint, oil, and wax. Fill cracks, rough areas, and other surface defects with plastic material.
- B. Comply with the recommendations of the manufacturer of the flooring.
- C. Store materials at a minimum temperature of 75 degrees F for at least 24 hours before installation. Maintain a temperature of at least 75 degrees F in the spaces where flooring is being installed for at least 48 hours after installation. Provide adequate ventilation.
- D. Lay tiles in cement as recommended by the manufacturer. Pattern shall be straight, in alignment with the axes of the spaces. No borders will be required. Tightly fit joints so that each tile is in contact with the surrounding tiles and all joints are in proper alignment.
- E. Make changes in color in adjoining rooms at the stop side of the door, or, in the absence of a door, in the center of the partition. End tile work in similar locations. Where tile work stops and the finished surface of the tile is above the finished surface of the adjoining floor, finish the tile work with a vinyl reducer. Where the tile work adjoins a different flooring material at the same finished surface level, the joint shall be made with an aluminum terrazzo strip 1/8 inch wide, set flush with the surface.
- F. Secure base to the walls and other vertical surfaces with all joints tight, and with top and bottom edges in firm contact with the walls and other vertical surfaces throughout its entire length.

### **3.2 INSTALLATION - RUBBER WALL BASE**

- A. General: Comply with base manufacturer's installation directions and other requirements indicated.

- B. Lay materials true to line, level, with tight joints. Use longest lengths practicable. Form corners by wrapping with wall base. Notch base at inside corners and shave back at outside corners where required to product tight fit.

### **3.3 CLEANING AND WAXING**

- A. Thoroughly clean the work of adhesive, cement, dirt, and other soiling, using a neutral cleaner as recommended by the manufacturer of the flooring. Apply two coats of an approved water-emulsion tile wax to the flooring and buff well. At completion, protect the floors by covering with building paper or by keeping traffic off the area until the building is ready for occupancy.

END OF SECTION

## SECTION 09900

### PAINTING

#### PART 1 – GENERAL

##### 1.1 DESCRIPTION

- A. Section includes all labor, materials, tools and other equipment, services and supervision required to complete all exterior and interior painting as indicated on Painting Schedules and to the full extent of the drawings and specifications.
- B. Work under this contract shall also include, but not necessarily be limited to:
  - 1. Surface preparation of substrates as required for acceptance of painting, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to the limits defined under MPI preparation requirements.
  - 2. Priming (except where pre-primed with an approved primer under other Sections of work) and painting of structural steel, miscellaneous metal, ornamental metal and primed steel equipment.
  - 3. Priming and back-priming of wood materials as noted herein or specified in the *MPI* Architectural Painting Specification Manual.
  - 4. Refer to drawings and schedules (e.g., Finish Schedule) for type, location and extent of finishes required, and include all touch-ups and field painting necessary to complete work shown, scheduled or specified
  - 5. This Section along with the drawings forms part of the Contract documents and is to be read, interpreted and coordinated with all other parts, including .General Conditions and Division 1 - General Requirements form an integral part of this Section of Work. Painting subcontractor shall refer to these and all other related parts.

##### 1.2 RELATED SECTIONS

- A. Unless otherwise noted, the following work or conditions are not included under this Section of work:
  - 1. Section 01500 - Temporary Facilities (temporary heat, lighting, scaffolds, etc.)
  - 2. Section 05120 - Structural Steel (shop primers)
  - 3. Section 05500 - Miscellaneous Metals (shop primers if applicable)
  - 4. Section 08211 – Flush Wood Doors (pre-finishing)
  - 5. Division 15 - Mechanical (stenciling, banding of mechanical systems)
  - 6. Division 16 - Electrical (stenciling, banding of electrical systems)
  - 7. Condition of substrates, correction of defects and deficiencies in substrates which may adversely affect painting work, except for minimal work performed

by this trade and preparation of surfaces to receive paint and finishes under this section of work.

8. Painting of copper, aluminum, stainless steel, nickel, bronze or brass surfaces, unless otherwise specified herein.
9. Traffic markings, e.g., parking bay lines and numbers, barrier free accessible and visitor parking bay designations.
10. Paint identification of equipment and services and hazards to safety.
11. Painting of mechanical (heating, ventilating and plumbing services and equipment) and electrical work including color coding, stenciling and banding.

### 1.3 REFERENCES

- A. The latest edition of the following reference standards shall govern all painting work:
  1. Architectural Painting Specification Manual by the Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List. (hereafter referred to as the **MPI** Painting Manual) as issued by the local **MPI** Accredited Quality Assurance Association having jurisdiction.

### 1.4 QUALITY ASSURANCE

- A. Materials, preparation and workmanship shall conform to requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute (**MPI**) (hereafter referred to as the **MPI** Painting Manual) as issued by the local **MPI** Accredited Quality Assurance Association having jurisdiction.
- B. All paint manufacturers and products used shall be as listed under the Approved Product List section of the **MPI** Painting Manual.

### 1.5 SUBMITTALS

- A. All submittals shall be in accordance with the requirements of Section 01300 - Submittals.
- B. Submit a list of paint systems to the Architect for review prior to ordering materials.
- C. At project completion provide an itemized list complete with manufacturer, paint type and color coding for all colors used for Owner's later use in maintenance.
- D. At project completion provide properly packaged maintenance materials as noted herein and obtain a signed receipt.

### 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver all painting materials in sealed, original labeled containers bearing manufacturer's name, brand name, type of paint or coating and color designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.
- B. Store all paint materials in original labeled containers in a secure (lockable), dry, heated and well ventilated single designated area meeting the minimum requirements of both paint manufacturer and authorities having jurisdiction and at a minimum ambient temperature of 45 degrees F Only material used on this project to be stored on site.
- C. Where toxic and/or volatile / explosive / flammable materials are being used, provide adequate fireproof storage lockers and take all necessary precautions and post adequate warnings (e.g. no smoking) as required.
- D. Take all necessary precautionary and safety measures to prevent fire hazards and spontaneous combustion and to protect the environment from hazard spills. Materials that constitute a fire hazard (paints, solvents, drop clothes, etc.) shall be stored in suitable closed and rated containers and removed from the site on a daily basis.

## **1.7 PROJECT / SITE REQUIREMENTS**

- A. Unless specifically pre-approved by Architect and the applied product manufacturer, perform no painting or decorating work when the ambient air and substrate temperatures are below 50 degrees F for both interior and exterior work.
- B. Perform no exterior painting work unless environmental conditions are within MPI and paint manufacturer's requirements or until adequate weather protection is provided. Where required, suitable weatherproof covering and sufficient heating facilities shall be in place to maintain minimum ambient air and substrate temperatures for 24 hours before, during and after paint application.
- C. Perform no interior painting unless adequate continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above minimum requirements for 24 hours before, during and after paint application. Provide supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- D. Perform no painting or decorating work when the relative humidity is above 85 percent or when the dew point is less than 5 degrees F variance between the air / surface temperature.
- E. Perform no painting or decorating work when the maximum moisture content of the substrate exceeds:
  - 1. 15 percent for wood.
  - 2. 12 percent for plaster and gypsum board.
- F. Conduct all moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple cover patch test.

- G. Test concrete, masonry and plaster surfaces for alkalinity as required.
- H. Apply paint only to dry, clean, properly cured and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.
- I. Perform no painting or decorating work unless a minimum lighting level of 323 Lux (30 foot candles) is provided on surfaces to be painted or decorated. Adequate lighting facilities shall be provided by the General Contractor.

## 1.8 EXTRA MATERIALS

- A. At project completion provide (5) 1- gallon containers of each type and color of paint from same production run (batch mix) used in unopened cans, properly labeled and identified for Owner's later use in maintenance. Store where directed.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Only materials (primers, paints, coatings, fillers, etc.) listed in the latest edition of the **MPI** Approved Product List (APL) are acceptable for use on this project. All such material shall be from a single manufacturer for each system used.
- B. Other materials such as thinners, solvents, etc. shall be the highest quality product of an **MPI** listed manufacturer and shall be compatible with paint materials being used as required.
- C. All materials used shall be lead and mercury free.
- D. All paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes, sags, air entrapment, etc. Refer to 3.7, Field Quality Control / Standard of Acceptance requirements.
- E. Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by local Code requirements and/or authorities having jurisdiction.

### 2.2 MIXING AND TINTING:

- A. Unless otherwise specified herein or pre-approved, all paint shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.
- B. Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- C. Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

- D. If required, thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.

**2.3 FINISH AND COLORS**

- A. Unless otherwise specified herein, all painting work shall be in accordance with **MPI** Custom Grade finish requirements.
- B. Colors shall be as selected by the Architect from a manufacturer’s full range of colors.
- C. Walls shall be painted the same color within a given area.
- D. Ceilings shall be painted white if applicable.
- E. Interior walls and ceiling surfaces shall be painted in accordance with the following criteria over appropriate prime / sealer coat:
  - 1. All areas (except as noted): washable latex with G3 (eggshell) finish.
  - 2. Mechanical Room, Locker and Toilet Rooms: washable latex with G5 (semi-gloss) finish.
- F. Doors, frames and trim shall be painted a different color than walls. Unless otherwise noted or scheduled all doors, frames and trim shall be painted using a G6 (gloss) finish.
- G. Access doors, prime coated butts and other prime painted hardware, exposed piping and electrical panels shall be painted to match adjacent surfaces (i.e. same color, texture and sheen), unless otherwise noted or where pre-finished.
- H. Plywood service panels (e.g. electrical, telephone, etc.) including edges shall be back-primed and painted to match painted wall mounted on.

**2.4 GLOSS / SHEEN RATINGS**

- A. Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following **MPI** values:

<b>Gloss Level</b>	<b>Description</b>	<b>Units @ 60 degrees</b>	<b>Units @ 85 degrees</b>
<b>G1</b>	Matte or Flat finish	0 to 5	10 max.
<b>G2</b>	Velvet finish	0 to 10	10 to 35
<b>G3</b>	Eggshell finish	10 to 25	10 to 35
<b>G4</b>	Satin finish	20 to 35	35 min.
<b>G5</b>	Semi-Gloss finish	35 to 70	
<b>G6</b>	Gloss finish	70 to 85	
<b>G7</b>	High-Gloss finish	> 85	

## **PART 3 - EXECUTION**

### **3.1 CONDITION OF SURFACES**

- A. Prior to commencement of work of this section, thoroughly examine (and test as required) all conditions and surfaces scheduled to be painted and report in writing to the Architect any conditions or surfaces that will adversely affect work of this section.
- B. No painting work shall commence until all such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Architect
- C. Commencement of work shall not be held to imply acceptance of surfaces except as qualified herein. Repair of such surfaces as concrete, masonry, structural steel and miscellaneous metal, wood, gypsum board and plaster is specified in other sections.

### **3.2 PREPARATION OF SURFACES:**

- A. Prepare all surfaces in accordance with **MPI** requirements. Refer to the **MPI** Painting Manual in regard to specific requirements for the following:
  - 1. vertical and horizontal concrete surfaces.
  - 2. concrete masonry units.
  - 3. structural steel and miscellaneous metals.
  - 4. galvanized and zinc coated metal.
  - 5. gypsum board.
- B. Sand, clean, dry, etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.
- C. Remove and securely store all miscellaneous hardware and surface fittings / fastenings (e.g. electrical plates, mechanical louvers, door and window hardware (e.g. hinges, knobs, locks, trim, frame stops), removable rating / hazard / instruction labels, washroom accessories, light fixture trim, etc. from wall and ceiling surfaces, doors and frames, prior to painting. Carefully clean and replace all such items upon completion of painting work in each area. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes (e.g. lacquer finishes). Doors shall be removed before painting to paint bottom and top edges and then re-hung.
- D. Protect all adjacent interior surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, etc., from painting operations and damage with drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
- E. Substrate defects shall be made good and sanded ready for painting particularly after the first coat of paint. Start of finish painting of defective surfaces (e.g. gypsum board) shall indicate acceptance of substrate and any costs of making



good defects shall be borne the Contractor (no touch-up painting).

- F. Confirm preparation and primer used with fabricator of steel items. Refer to Quality Assurance.

### 3.3 APPLICATION

- A. Do not paint unless substrates are acceptable and/or until all environmental conditions (heating, ventilation, lighting and completion of other subtrade work) are acceptable for applications of products.
- B. Apply paint or stain in accordance with MPI Painting Manual [Premium] [Custom] Grade finish requirements.
- C. Apply paint in a workmanlike manner using skilled and trade qualified applicators as noted under Quality Assurance.
- D. Apply paint and coatings within an appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or the manufacturer's paint specifications require earlier applications.
- E. Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
- F. Tint each coat of paint progressively lighter to enable confirmation of number of coats.
- G. Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1000 mm (39").
- H. Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.

### 3.4 EXTERIOR FINISH / COATING SYSTEMS

Paint exterior surfaces in accordance with the following **MPI** Painting Manual requirements:

- A. Cementitious Composition Board Surfaces: (vertical surfaces, horizontal soffits)  
EXT 3.3A Latex [ G3 gloss level] finish.
- B. Concrete Masonry Units: (specified in Section 04200 Unit Masonry).
- C. Metal Fabrications:  
EXT 5.1G Polyurethane, pigmented finish (over epoxy zinc rich primer and high build epoxy).
- D. Galvanized Metal: (not chromate passivated)  
For high contact / high traffic areas (doors, frames, etc.  
  
EXT 5.3A Polyurethane, pigmented finish (over vinyl wash and epoxy primer).  
[for use on high contact / high traffic areas]

### 3.5 INTERIOR PAINT AND COATING SYSTEMS

Paint interior surfaces in accordance with the following *MPI* Painting Manual requirements:

- A. Metal Fabrications: (Doors, frames, etc.)
  - INT 5.1J Polyurethane, pigmented finish (over epoxy zinc rich primer and epoxy).
- B. Galvanized Metal:
  - NT 5.3M High performance architectural latex [G5 gloss level] finish.
- C. Gypsum Board: (gypsum wallboard, drywall, "sheet rock type material", etc.)
  - INT 9.2A Latex [G3 gloss level] finish (over latex sealer).

### 3.6 MECHANICAL / ELECTRICAL EQUIPMENT AND RELATED SURFACES

- A. Except for Mechanical Room, paint all "unfinished" conduits, piping, hangers, ductwork and other mechanical and electrical equipment with color and texture to match adjacent surfaces, where exposed-to-view in all exterior and interior areas.
- B. Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- C. Do not paint over nameplates.
- D. Backprime and paint face and edges of plywood service panels for telephone and electrical equipment before installation to match adjacent wall surface. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

### 3.7 FIELD QUALITY CONTROL / STANDARD OF ACCEPTANCE

- A. Painted exterior and interior surfaces will be considered to lack uniformity and soundness if any of the following defects are apparent to the Architect
  - 1. brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
  - 2. evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
  - 3. damage due to touching before paint is sufficiently dry or any other contributory cause.

4. damage due to application on moist surfaces or caused by inadequate protection from the weather.
  5. damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
- B. Painted surfaces will be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces:
1. visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
  2. visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
  3. visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
  4. when the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.
- C. Painted surfaces rejected by the Architect shall be made good at the expense of the Contractor. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

### **3.8 PROTECTION**

- A. Protect all exterior surfaces and areas, including landscaping, walks, drives, all adjacent building surfaces (including glass, aluminum surfaces, etc.) and equipment and any labels and signage from painting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
- B. Protect all interior surfaces and areas, including glass, aluminum surfaces, etc. and equipment and any labels and signage from painting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
- C. Erect barriers or screens and post signs to warn of or limit or direct traffic away or around work area as required.

### **3.9 CLEAN-UP**

- A. Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- B. Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.
- C. Remove combustible rubbish materials and empty paint cans each day and safely

dispose of same in accordance with requirements of authorities having jurisdiction.

- D. Clean equipment and dispose of wash water / solvents as well as all other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers / strippers in accordance with the safety requirements of authorities having jurisdiction.

END OF SECTION

## **DIVISION 10 - SPECIALTIES**

### **SECTION 10170**

#### **PLASTIC TOILET COMPARTMENTS**

##### **PART 1 GENERAL**

###### **1.1 SUMMARY**

- A. Section Includes: Stock, manufactured toilet compartments.
  - 1. Material: Solid plastic, homogenous color.
  - 2. Styles:
    - a. Water Closet Compartments: Floor-anchored, overhead-braced.
    - b. Urinal Screens: Wall hung.

###### **1.2 RELATED DOCUMENTS**

- A. Related Sections: Sections containing requirements that relate to this Section include, but are not necessarily limited to:
  - 1. Section 10800 "Toilet Room Accessories".

###### **1.3 SUBMITTALS**

- A. General: Submit in accordance with Conditions of the Contract and requirements of Section 01300 "Submittals".
- B. Product data for materials, fabrication, and installation including catalog cuts of anchors, hardware, fastenings, and accessories.
- C. Shop drawings for fabrication and erection of toilet compartment assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other work.
- D. Samples of full range of manufacturer's standard colors for initial color selection in form of printed color charts or color chips.
- E. Samples for verification of initial color selection. Submit 6-inch-square samples of actual partition material, in each selected color and finish, for color verification after initial selections have been made.

## 1.4 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of work. However, allow for adjustments where taking of field measurements before fabrication might delay work.
- B. Coordination: Furnish inserts and anchors which must be built into other work for installation of toilet compartments and related items. Coordinate delivery with other work to avoid delay.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Solid plastic toilet compartments including the following:
    - a. Santana Products, Inc.
    - b. Ampco Products, Inc.
    - c. All American Metal Corp AMMCO

### 2.2 MATERIALS

- A. General: Provide materials selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, stains, discoloration, or other imperfections on finished units are not acceptable.
- B. Solid Plastic Panels, Doors, Pilasters: Class C, high density polyethylene (HDPE) resin with homogenous color throughout. Provide material not less than 1 inch thick with seamless construction with edges eased.
- C. Overhead Bracing: Continuous extruded aluminum, antigrip profile, clear anodized finish.
- D. Pilaster Shoes and Caps: ASTM A 167, Type 302/304 stainless steel, not less than 3 inches high, 0.0396 inch thick (20 gage), brushed satin finish.
- E. Wall Brackets for Urinal Screens: Double ear continuous extruded aluminum, clear anodized finish.
- F. Other Wall Brackets: Stirrup type, minimum of 1 ½ inches high.
- G. Hardware and Accessories: Except for hinges, manufacturer's standard design, heavy duty operating hardware and accessories of extruded aluminum with clear

anodized finish, or chromium-plated, nonferrous cast alloy ("Zamac"), as specified. Hinges shall be 8 inch wrap-around type constructed of minimum 1/8 inch thick aluminum.

- H. Concealed Tapping Reinforcement: Minimum 0.0785 inch (14 gage), galvanized steel sheet.
- I. Anchorages and Fasteners: Manufacturer's standard fasteners of stainless steel or brass, finished to match hardware, with theft-resistant-type heads and nuts.

## 2.3 FABRICATION

- A. General: Furnish standard doors, panels, screens, and pilasters fabricated for compartment system. Furnish units with cutouts, drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories, and grab bars, as indicated.
- B. Toilet Compartments:
  - 1. Style: Floor-mounted overhead-braced. Furnish galvanized steel supports and leveling bolts at pilasters as recommended by manufacturer to suit floor conditions. Make provisions for setting and securing continuous, extruded, aluminum, antigrip, overhead bracing at top of each pilaster. Provide shoe at each pilaster to conceal supports and leveling mechanism.
  - 2. Wall Panels: 58 inches high; compartment pilasters approximately 82 inches high.
  - 3. Doors: 58-inches high in-swinging, except provide 34" inches wide out-swinging doors for handicapped accessible compartments.
  - 4. Distance from floor to bottom of partitions and doors: 14 inches.
  - 5. Hardware: Furnish following hardware for each compartment. Provide hardware for handicapped-accessible compartments complying with requirements of Americans with Disabilities Act (28 CFR Part 36).
    - a. Hinges: Extruded aluminum wrap-around type, with gravity-actuated cam adjustable to hold door open at any angle up to 90 degrees.
    - b. Latch: Extruded aluminum slide-bolt, surface-mounted, designed for handicapped accessibility.
    - c. Strike and Keeper: Extruded aluminum wrap-around style combination rubber-faced door strike and keeper.
    - d. Coat Hook: Cast alloy, combination hook and rubber-tipped bumper, sized to prevent door hitting mounted accessories.
    - e. Door Pull: Cast alloy, for out-swinging doors only.
- C. Urinal Screens:
  - 1. Style: Wall-mounted with continuous double ear brackets.

2. Screen Panels: 42 inches high by 18 inches wide; mounted 14 inches above finished floor.

## **2.4 FINISH**

- A. Color: One of manufacturer's colors in each room as selected by Architect. Provide a minimum of 15 color choices.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. General: Comply with manufacturer's recommended procedures and installation sequence. Install compartment units rigid, straight, plumb, and level. Provide clearances of not more than 1/2 inch between pilasters and panels, and not more than 1 inch between panels and walls. Secure panels to walls with not less than two stirrup brackets attached near top and bottom of panel. Locate wall brackets so that holes for wall anchorages occur in masonry or tile joints. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall. Secure panels in position with manufacturer's recommended anchoring devices.
- B. Overhead-Braced Compartments: Secure pilasters to floor and level, plumb, and tighten installation with devices furnished. Secure overhead brace to each pilaster with not less than two fasteners. Hang doors and adjust so that tops of doors are parallel with overhead brace when doors are in closed position.

### **3.2 ADJUST AND CLEAN**

- A. Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return to fully closed position.
- B. Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

END OF SECTION



## SECTION 10426

### SIGNS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following types of signs:
  - 1. Room Signage.

##### 1.2 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specifications Sections.
- B. Product data for each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- C. Samples: Provide samples of each sign component for initial selection of color, pattern and surface texture.

#### PART 2 PRODUCTS

##### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Manufacturers of Panel Signs:
    - a. ABC Architectural Signing System.
    - b. Andco Industries Corp.
    - c. ASI Sign Systems, Inc.
    - d. Best Manufacturing Sign Systems
- B. Schedule: Model numbers of Best Manufacturing Sign Systems are listed below. Equivalent products of other listed manufacturers are acceptable.
  - 1. Interior Signs:
    - a. Accessible Restrooms: HC300A, ADA System, 6" x 8", Pictogram. Respectively, designate rooms as Men or Women.
- C. Fasteners: Use manufacturers standard fastening method for specified system

- D. Anchors and Inserts: Use non-ferrous metal or hot-dipped galvanized anchors and inserts for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
  - 1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:
  - 1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
  - 2. Shim Plate Mounting: Provide 1/8-inch-thick concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other mounting methods are not practicable. Attach the plate with fasteners and anchors suitable for secure attachment to the substrate. Attach panel sign units to the plate using the method specified above.

### **3.2 CLEANING AND PROTECTION**

- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION

**SECTION 10505**  
**METAL LOCKERS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
1. Single-tier lockers.

**1.2 SUBMITTALS**

- A. General: Submit in accordance with Conditions of the Contract and requirements of Section 01300 "Submittals."
- B. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of locker.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work. Show locker fillers, trim, base, sloping tops, and accessories. Include locker-numbering sequence.
- D. Samples for Initial Color Selection: Printed color charts or color chips showing full range of manufacturer's standard factory-applied finishes.
- E. Samples for Color Verification: When required by Architect, provide 2-inch-square samples of actual locker material and finish, in each color and finish initially selected.
- F. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals specified in Division 1.

**1.3 QUALITY ASSURANCE**

- A. Source Limitations: Obtain locker units and accessories through one source from a single manufacturer.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Do not deliver lockers until space to receive them is clean, dry, and ready for locker installation.
- B. Protect lockers from damage during delivery, handling, storage, and installation.

## 1.5 COORDINATION

- A. Coordinate size and location of concrete bases.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Steel: Prime grade mild cold-rolled sheet steel free from surface imperfection, capable of taking a high-grade enamel finish and in compliance with ASTM A1008. Sheet steel components shall be fabricated using zinc-coated steel free from surface imperfection, capable of taking a high-grade enamel finish and in compliance with ASTM A879.
- B. Hooks: Zinc plated forged steel, ball ends.
- C. Bolts and Nuts: Zinc plated truss fin head bolts and hex nuts.

### 2.2 METAL LOCKERS

- A. Provide Republic Storage Systems Company "Standard Locker," Penco Products Vanguard, Lyon Lockers or equivalent.
  - 1. Type: Single-tier.
  - 2. Size: 18 inches wide by 24 inches deep by 72 inches high.
  - 3. Doors: 16 gage, multi-point latch, padlock eye, three 2-inch 5 knuckle hinges, rubber silencers
  - 4. Interior equipment:
    - a. Internal shelf, mounted between 9 inches and 12 inches from top of locker.
    - b. Clothes hooks: double prong hook on back wall, single-prong hook on each side wall.
  - 5. Number Plate: Provide each locker door, aluminum, 1/2" letters.
  - 6. Finish: Enamel powder coat, color as selected by architect.
- B. Accessible Locker:
  - 1. Equip door with recessed handle
  - 2. Provide an additional shelf at 15 inches above finish floor.
  - 3. Locate hat shelf at 48 inches above finish floor.

### 2.3 LOCKER ACCESSORIES

- A. Continuous Sloping Tops: Manufacturer's standard, fabricated from minimum 0.0359-inch-thick steel sheet, for installation over lockers with flat tops. Fabricate tops in lengths as long as practicable, without visible fasteners at splice locations, finished to match lockers. Provide fasteners, filler plates, supports, and closures.

1. Closures: Vertical-end type, 20 gage.
  2. Corner Fillers: Sloped top, mitered, 18 gage.
- B. Filler Panels: Manufacturer's standard; fabricated from minimum 0.0478-inch- thick steel sheet in an unequal leg angle shape, and finished to match lockers. Provide slip joint filler angle formed to receive filler panel.
- C. Finished End Panels: Manufacturer's standard; fabricated from minimum 0.0239-inch- thick steel sheet, finished to match lockers, and designed for concealing exposed ends of nonrecessed lockers.
- D. Base: "Z" type, 14 gage steel with inward flange at floor level

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install metal lockers and accessories level, plumb, rigid, and flush according to manufacturer's written instructions.
- B. Connect groups of lockers together with standard fasteners, with no exposed fasteners on face frames.
- C. Anchor lockers to floors and walls at intervals recommended by manufacturer, but not more than 36 inches on center. Install anchors through backup reinforcing plates where necessary to avoid metal distortion, using concealed fasteners.
- D. Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
1. Attach sloping top units to lockers, with closures at exposed ends.
- E. Attach boxed end panels with concealed fasteners to conceal exposed ends of nonrecessed lockers.

### **3.2 ADJUSTING, CLEANING, AND PROTECTION**

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.
- B. Clean interior and exposed exterior surfaces and polish stainless-steel and nonferrous-metal surfaces.
- C. Protect lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit locker use during construction.

- D. Touch up marred finishes, or replace locker units that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION

## SECTION 10522

### FIRE EXTINGUISHER CABINETS

#### PART 1 GENERAL

##### 1.1 SUMMARY

A. Section Includes: Fire extinguisher cabinets.

##### 1.2 WORK BY OWNER

A. Owner will furnish and install fire extinguishers.

##### 1.3 SUBMITTALS

- A. General: Submit in accordance with Conditions of the Contract and requirements of Section 01300 "Submittals".
- B. Product data for cabinets include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.

#### PART 2 PRODUCTS

##### 2.1 MANUFACTURERS

- A. Subject to compliance with specified requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to:
1. J.L. Industries.
  2. Larsen's Manufacturing Co.
  3. Potter-Roemer, Inc.

##### 2.2 CABINETS

- A. Construction: Type 304 stainless steel, with joints welded and ground smooth.
- B. Cabinet Size: Inside box dimension of approximately 27 inches high by 12 inches wide by 8 inches deep.
- C. Mounting: Semi-recessed.
- D. Finish: Stainless steel, #4 satin.

## **2.3 DOOR**

- A. Construction: One-piece door fabricated from type 304 stainless steel.
- B. Style: Vertical-duo (with vertical glass pane, approximately 3" by 24").
  - 1. Door Glazing: Fully-tempered float glass.
- C. Door Hardware: Zinc-alloy recessed pull. Friction or roller catch. Continuous piano-type hinge permitting door to open 180 deg.
- D. Finish: Stainless steel, #4 satin.

## **2.4 TRIM**

- A. Construction: One-piece perimeter trim and door frame fabricated from same material as door. Provide rolled-edge trim overlapping surrounding construction and having 4 inch maximum projection from face of wall.
- B. Finish: Same as door.

## **2.5 PROTECTION**

- A. Protect mechanical finishes on exposed surfaces from damage by applying temporary strippable protective covering prior to shipping.

# **PART 3 EXECUTION**

## **3.1 EXAMINATION**

- A. Examine walls and partitions for thickness and framing for cabinets to verify cabinet depth and mounting prior to cabinet installation.
- B. Do not proceed until unsatisfactory conditions have been corrected.

## **3.2 INSTALLATION**

- A. Follow manufacturer's printed instructions for installation.
- B. Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities.
  - 1. Prepare recesses in walls for cabinet as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

END OF SECTION



## SECTION 10800

### TOILET ROOM ACCESSORIES

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. This Section includes toilet accessory items as scheduled.

##### 1.2 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specifications Sections.
- B. Product data for each toilet accessory item specified, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.
- C. Maintenance instructions including replaceable parts list and service recommendations.

##### 1.3 PROJECT CONDITIONS

- A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

##### 1.4 WARRANTY

- A. Warranty: Submit a written warranty executed by mirror manufacturer, agreeing to replace any mirrors that develop visible silver spoilage defects within warranty period.
  - 1. Warranty Period: 15 years from date of Substantial Completion.
  - 2. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

#### PART 2 PRODUCTS

##### 2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering toilet accessories that may be incorporated in the Work include, but are not limited to, the following:
  - 1. A & J Washroom Accessories.
  - 2. American Specialties, Inc.
  - 3. Bobrick Washroom Equipment, Inc.

4. Bradley Corporation.
5. General Accessory Manufacturing Co.
6. McKinney/Parker.

## **2.2 MATERIALS, GENERAL**

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 0.034-inch (22-gage) minimum thickness.
- B. Brass: Leaded and unleaded, flat products, ASTM B 19; rods, shapes, forgings, and flat products with finished edges, ASTM B 16; Castings, ASTM B 30.
- C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 0.04-inch (20-gage) minimum. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A 527, G60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.
- F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.
- G. Mirror Glass: Nominal 6.0-mm (0.23-inch) thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro-plated copper coating, and protective organic coating.
- H. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.
- I. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

## **2.3 FABRICATION**

- A. General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of each accessory item either by a printed, waterproof label or a stamped nameplate indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.
- C. Framed Mirror Units, General: Fabricate frames for glass mirror units to accommodate wood, felt, plastic, or other glass edge protection material. Provide mirror backing and support system that will permit rigid, tamperproof glass installation and prevent moisture accumulation, as follows:

1. Provide galvanized-steel backing sheet, not less than 0.034 inch (22 gage) and full mirror size, with non-absorptive filler material. Corrugated cardboard is not an acceptable filler material.
- D. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, re-supply, etc. Provide minimum of six keys to Owner's representative.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.

### **3.2 ADJUSTING AND CLEANING**

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

### **3.3 SCHEDULE OF ACCESSORIES**

- A. Install all toilet accessories in strict accordance with the manufacturer's recommendations in the locations shown on the drawings.
- B. Accessory Schedule:
  1. Grab Bars: Bobrick Series B-6806, Bradley 812 Series, ASI 3200 Series, sizes as noted.
  2. Toilet Tissue Dispenser : by Owner
  3. Sanitary Napkin Disposal: Bobrick Series B-254, Bradley 4722-15, ASI 0473-1A.
  4. Mirror: Bobrick Series B-290, Bradley 781, ASI 620, size as noted
  5. Soap Dispenser: by Owner.
  6. Paper Towel Dispenser: by Owner.
  7. Folding Dressing Area Seat: Bobrick B-5193.

END OF SECTION

## **DIVISION 12 - FURNISHINGS**

### **SECTION 12350**

#### **CASEWORK**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Cabinets.
- B. Countertops.
- C. Casework hardware.

##### **1.2 REFERENCE STANDARDS**

- A. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association ; 2010 (ANSI/BHMA A156.9).
- B. ANSI/KCMA A161.1 - Performance and Construction Standard for Kitchen and Vanity Cabinets; Kitchen Cabinet Manufacturers Association.
- C. KCMA (DIR) - Directory of Certified Cabinet Manufacturers; Kitchen Cabinet Manufacturers Association.

##### **1.3 SUBMITTALS**

- A. See Section 01300 - Submittals, for submittal procedures.
- B. Product Data: Provide component dimensions and construction details.
- C. Shop Drawings: Indicate casework locations, large scale plans, elevations, clearances required, rough-in and anchor placement dimensions and tolerances.

##### **1.4 QUALITY ASSURANCE**

- A. Products: Complying with KCMA A161.1 and KCMA Certified.

#### **PART 2 PRODUCTS**

##### **2.1 MANUFACTURERS**

- A. Casework:
  - 1. Wellborn Cabinet, Inc : [www.wellborn.com](http://www.wellborn.com).
  - 2. Kraftmaid Cabinetry: [www.kraftmaid.com](http://www.kraftmaid.com)
  - 2. Marsh Furniture Co. [www.marshfurniture.com](http://www.marshfurniture.com)
  - 3. Substitutions: Complying with Quality Assurance and equivalent.

##### **2.2 COMPONENTS**

- A. Cabinet Construction: Softwood lumber framing and particle board , tempered hardboard gables.
- B. Countertop: Post formed plastic laminate over particle board, coved to back splash.

1. Side Splash: Plastic laminate over particle board, square internal intersections to back splash and top surface , contoured to suit counter top profile.
- C. Door and Drawer Fronts: Plastic laminate
- D. Shelving: Adjustable, manufacturer's standard.
- D. Bolts, Nuts, Washers and Screws: Of size and type to suit application.

### **2.3 HARDWARE**

- A. Hardware: Manufacturer's standard.
- B. Drawer and Door Pulls: Chrome wire pulls, 4 inches (102 mm) wide.
- C. Drawer Slides: Extension arms, steel construction, 50 pound minimum
- D. Hinges: Offset pin.

### **2.4 FABRICATION**

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. Fabricate corners and joints without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.
- C. Fabricate each unit to be rigid and not dependent on building structure for rigidity.
- D. Form smooth edges. Form material for countertops, shelves, and drain boards from continuous sheets.
- E. Provide cutouts for plumbing fixtures, appliances, and fixtures and fittings. Prime paint contact surfaces of cut edges.
- F. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

### **2.5 FINISHES**

- A. Exposed To View Surfaces: Plastic laminate

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify adequacy of support framing.

### **3.2 INSTALLATION**

- A. Install casework, components and accessories in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered.
- C. Set casework items plumb and square, securely anchored to building structure.
- D. Close ends of units, back splashes, shelves and bases.

### **3.3 ADJUSTING**

- A. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly.

### **3.4 CLEANING**

- A. Clean casework, countertops, shelves, and hardware.

### **3.5 PROTECTION**

- A. Do not permit finished casework to be exposed to continued construction activity.

END OF SECTION

## **DIVISION 15 - MECHANICAL**

### **SECTION 15075**

#### **MECHANICAL IDENTIFICATION**

##### **PART 1 GENERAL**

###### **1.1 SECTION INCLUDES**

- A. Nameplates.
- B. Tags.
- C. Pipe markers.

###### **1.2 REFERENCE STANDARDS**

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007 (ANSI/ASME A13.1).

###### **1.3 SUBMITTALS**

- A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- C. Product Data: Provide manufacturers catalog literature for each product required.
- D. Project Record Documents: Record actual locations of tagged valves.

##### **PART 2 PRODUCTS**

###### **2.1 IDENTIFICATION APPLICATIONS**

- A. All Equipment: Nameplates
- B. Indoor and Outdoor Units: Nameplates.
- C. Automatic Controls: Tags. Key to control schematic.
- D. Control Panels: Nameplates.
- E. Instrumentation: Tags.
- F. Major Control Components: Nameplates.
- G. Piping: Pipe markers.
- H. Small-sized Equipment: Tags.
- I. Valves: Tags and ceiling tacks where located above lay-in ceiling.

###### **2.2 MANUFACTURERS**

- A. Brady Corporation: [www.bradycorp.com](http://www.bradycorp.com).
- B. Champion America, Inc: [www.Champion-America.com](http://www.Champion-America.com).
- C. Seton Identification Products: [www.seton.com/aec](http://www.seton.com/aec).

###### **2.3 NAMEPLATES**

- A. Description: Laminated three-layer plastic with engraved letters.
  - 1. Letter Color: White.

2. Letter Height: 1/4 inch.
3. Background Color: Black.

## **2.4 TAGS**

- A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

## **2.5 PIPE MARKERS**

- A. Color: Conform to ASME A13.1.
- B. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

# **PART 3 EXECUTION**

## **3.1 PREPARATION**

- A. Degrease and clean surfaces to receive adhesive for identification materials.

## **3.2 INSTALLATION**

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- E. Identify HVAC equipment with plastic nameplates. Install nameplates on the side of wall and floor cabinet style Indoor Units such that nameplates are less visible to the public.
- F. Identify control panels and major control components outside panels with plastic nameplates.
- G. Identify valves in main and branch piping with tags.
- H. Tag automatic controls, instruments, and relays. Key to control schematic.
- I. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION



**SECTION 15082**  
**PIPING INSULATION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Piping insulation.
- B. Jackets and accessories.

**1.2 RELATED REQUIREMENTS**

- A. Section 15145 - Plumbing Piping: Placement of hangers and hanger inserts.

**1.3 REFERENCE STANDARDS**

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus; 2013.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2014.
- C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2015.
- D. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- G. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

**1.4 SUBMITTALS**

- A. Product Data: Provide product description, thermal characteristics, fire resistance characteristics, list of materials and thickness for each service, and locations.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with documented experience acceptable to the A/E.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

**1.7 FIELD CONDITIONS**

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

## **PART 2 PRODUCTS**

### **2.1 REGULATORY REQUIREMENTS**

- A. All material delivered to the job site shall be labeled, indicating compliance with the specified requirements, the manufacturer's name, the R-value, the flame spread and smoke-developed ratings at intervals not exceeding 36 inches. All pipe insulation shall be adequate to limit exposed surface temperature to 120 degrees F. The insulation shall not glow, smolder, flame or smoke when tested in accordance with ASTM C411 at 250 degrees F. All materials shall be tested by UL or an approved independent testing laboratory.
- B. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

### **2.2 GLASS FIBER**

- A. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
  - 1. 'K' Value: ASTM C177, 0.24 at 75 degrees F.
  - 2. Maximum Service Temperature: 650 degrees F.
  - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- B. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- C. Vapor Barrier Lap Adhesive: Compatible with insulation.
  - 1. Compatible with insulation.

### **2.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION**

- A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3; use molded tubular material wherever possible.
  - 1. Minimum Service Temperature: Minus 40 degrees F.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Exposed Piping: Locate insulation and cover seams in least visible locations.
- C. Glass fiber insulated pipes conveying fluids below ambient temperature:
  - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- D. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

- E. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- F. Glass fiber insulated pipes conveying fluids above ambient temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- G. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.
- H. For exterior exposed refrigerant pipe insulation, apply two coats of weatherproof, UV resistant protective exterior finish.

### **3.3 SCHEDULES**

- A. Plumbing Systems: If a pipe size is not listed below, provide additional insulation thickness that will provide the equivalent heat loss/gain as the specified thickness.
  - 1. Domestic Hot Water Supply:
    - a. Glass Fiber Insulation:
      - 1) Pipe Size Range: 1/2 to 2 inch.
      - 2) Thickness: 1 inch.
  - 2. Domestic Cold Water:
    - a. Glass Fiber Insulation:
      - 1) Pipe Size Range: 1/2 to 2 inch.
      - 2) Thickness: 3/4 inch.
- B. Cooling Systems:
  - 1. Condensate Drains from Cooling Coils:
    - a. Glass Fiber Insulation:
      - 1) Pipe Size Range: 1/2 to 2 inch.
      - 2) Thickness: 3/4 inch.
  - 2. Refrigerant Lines:
    - a. Flexible Elastomeric Cellular Insulation:
      - 1) Thickness: 1 inch.

END OF SECTION

## **SECTION 15086 DUCT INSULATION**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Duct insulation.

#### **1.2 REFERENCE STANDARDS**

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.
- B. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- E. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

#### **1.3 SUBMITTALS**

- A. Product Data: Provide product description, thermal characteristics, fire resistance characteristics, list of materials and thickness for each service, and locations.
- B. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

#### **1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with documented experience acceptable to the A/E.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

#### **1.6 FIELD CONDITIONS**

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

- B. Maintain temperature during and after installation for minimum period of 24 hours.

## **PART 2 PRODUCTS**

### **2.1 REGULATORY REQUIREMENTS**

- A. All material delivered to the job site shall be labeled, indicating compliance with the specified requirements, the manufacturer's name, the R-value, the flame spread and smoke-developed ratings at intervals not exceeding 36 inches. All duct insulation shall be adequate to limit exposed surface temperature to 120 degrees F. The insulation shall not glow, smolder, flame or smoke when tested in accordance with ASTM C411 at 250 degrees F. All materials shall be tested by UL or an approved independent testing laboratory.
- B. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

### **2.2 GLASS FIBER, FLEXIBLE**

- A. Insulation: ASTM C553; flexible, noncombustible blanket.
  - 1. 'K' value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
  - 2. Maximum Water Vapor Absorption: 5.0 percent by weight.
- B. Vapor Barrier Jacket (FSK):
  - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
  - 2. Moisture Vapor Permeability: 0.029 ng/Pa s m (0.02 perm inch), when tested in accordance with ASTM E96/E96M.
  - 3. Secure with pressure sensitive tape.
- C. Vapor Barrier Tape:
  - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Insulated ducts conveying air below ambient temperature:
  - 1. Provide insulation with vapor barrier jackets.
  - 2. Finish with tape and vapor barrier jacket.
  - 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
  - 4. Insulate tops of ceiling diffusers.
  - 5. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

- C. External Duct Insulation Application:
1. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
  2. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
  3. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

### **3.3 SCHEDULES**

- A. Supply, Return, Exhaust and Outside Air Ducts: 2" minimum flexible insulation, minimum R6 installed. Ducts located in the attic shall have minimum R8 insulation.

END OF SECTION

## SECTION 15145

### PLUMBING PIPING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Pipe, pipe fittings, valves, and connections for piping systems.
  - 1. Sanitary sewer.
  - 2. Domestic water.
  - 3. Flanges, unions, and couplings.
  - 4. Pipe hangers and supports.
  - 5. Valves.
  - 6. Strainers.

##### 1.2 RELATED REQUIREMENTS

- A. Section 15075 - Mechanical Identification.
- B. Section 15082 - Piping Insulation.

##### 1.3 REFERENCE STANDARDS

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2012 (ANSI B16.18).
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; The American Society of Mechanical Engineers; 2013.
- C. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2014 (ANSI/ASME B31.9).
- D. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2015.
- E. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- F. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2010.
- G. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.
- H. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2010.
- I. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2002 (Reapproved 2010).
- J. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2014.
- K. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012.
- L. ASTM D2609 - Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe; 2002 (Reapproved 2009).
- M. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.
- N. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings; 1996 (Reapproved 2010).

- O. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2014.
- P. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; Cast Iron Soil Pipe Institute; 2009.
- Q. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; Cast Iron Soil Pipe Institute; 2011
- R. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2009.
- S. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2010.
- T. NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).
- U. NSF 372 - Drinking Water System Components - Lead Content; 2011.

#### **1.4 SUBMITTALS**

- A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- B. Project Record Documents: Record actual locations of valves.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### **PART 2 PRODUCTS**

#### **2.1 GENERAL REQUIREMENTS**

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

#### **2.2 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING**

- A. Cast Iron Pipe: ASTM A74 service weight.
  - 1. Fittings: Cast iron.
  - 2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.
- B. PVC Pipe: ASTM D2665 solid wall or ASTM D3034.
  - 1. Fittings: PVC.
  - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.



## **2.3 SANITARY SEWER PIPING, ABOVE GRADE**

- A. Cast Iron Pipe: ASTM A74, service weight.
  - 1. Fittings: Cast iron.
  - 2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.
- B. Cast Iron Pipe: CISPI 301, hubless, service weight.
  - 1. Fittings: Cast iron.
  - 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.
- C. PVC Pipe: ASTM D2665 solid wall.
  - 1. Fittings: PVC.
  - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

## **2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING**

- A. Copper Pipe: ASTM B 42, Type K, hard drawn.
  - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
- B. PE Pipe: ASTM D2239, SIDR 7.
  - 1. Fittings: ASTM D2609, PE.
  - 2. Joints: Mechanical with stainless steel clamp.

## **2.5 DOMESTIC WATER PIPING, ABOVE GRADE**

- A. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), Drawn (H).
  - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
  - 2. Joints: ASTM B32, alloy Sn95 solder.

## **2.6 FLANGES, UNIONS, AND COUPLINGS**

- A. Unions for Pipe Sizes 3 Inches and Under:
  - 1. Ferrous pipe: Class 150 malleable iron threaded unions.
  - 2. Copper tube and pipe: Class 150 bronze unions with soldered joints.
- B. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

## **2.7 PIPE HANGERS AND SUPPORTS**

- A. Provide hangers and supports that comply with MSS SP-58 and the Virginia Plumbing Code.
  - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  - 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
  - 3. Trapeze Hangers: Welded steel channel frames attached to structure.
  - 4. Vertical Pipe Support: Steel riser clamp.
- B. Plumbing Piping - Drain, Waste, and Vent:
  - 1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
  - 2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
  - 3. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

4. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
  5. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- C. Plumbing Piping - Water:
1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
  2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
  3. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

## **2.8 BALL VALVES**

- A. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze body, 304 stainless steel ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle, solder or threaded ends with union.

## **2.9 STRAINERS**

- A. Size 2 inch and Under:
1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.

# **PART 3 EXECUTION**

## **3.1 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

## **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- G. Provide access doors where valves and fittings are not exposed.
- H. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
- I. Install bell and spigot pipe with bell end upstream.
- J. Install valves with stems upright or horizontal, not inverted.
- K. Install piping to ASME B31.9.
- L. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

- M. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- N. Sleeve pipes passing through masonry or concrete partitions, walls and floors. Anchor all sleeves to floor or wall construction. Coordinate firestopping details at rated walls.
- O. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9 and Virginia Plumbing Code.
  - 2. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 3. Place hangers within 12 inches of each horizontal elbow.
  - 4. Provide copper plated hangers and supports for copper piping.
  - 5. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
  - 6. Support cast iron drainage piping at every joint.

### **3.3 APPLICATION**

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.

### **3.4 TOLERANCES**

- A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.

### **3.5 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM**

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Disinfect water piping in accordance with Virginia Plumbing Code.

END OF SECTION

**SECTION 15146**  
**PLUMBING SPECIALTIES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Drains.
- B. Floor drains.
- C. Cleanouts.
- D. Backflow preventers.

**1.2 REFERENCE STANDARDS**

- A. ASME A112.6.3 - Floor and Trench Drains; The American Society of Mechanical Engineers; 2001 (R2007).
- B. ASSE 1013 - Reduced Pressure Principle Backflow Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers; American Society of Sanitary Engineering; 2011.
- C. NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).
- D. NSF 372 - Drinking Water System Components - Lead Content; 2011.

**1.3 SUBMITTALS**

- A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- B. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- C. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

**1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with documented experience, acceptable to the A/E.

**PART 2 PRODUCTS**

**2.1 GENERAL REQUIREMENTS**

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

**2.2 DRAINS**

- A. Floor Drain:
  - 1. ASME A112.6.3; lacquered cast iron two piece body with double drainage flange, weep holes, and round, adjustable round nickel bronze or chrome strainer as indicated.

**2.3 CLEANOUTS**

- A. Cleanouts at Interior Finished Floor Areas:

1. Lacquered cast iron body with anchor flange, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed nickel bronze cover to accept floor finish in finished floor areas.
- B. Cleanouts at Interior Finished Wall Areas:
  1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.
- C. Cleanouts at Interior Unfinished Accessible Areas: Calked or threaded type.

## **2.4 AIR ADMITTANCE VALVE**

- A. Automatic air admittance valve, per ASSE 1051. Install in accessible location, 4" above trap weir and in accordance with manufacturer's instructions.

## **2.5 BACKFLOW PREVENTERS**

- A. Reduced Pressure Backflow Preventers:
  1. ASSE 1013; bronze body with bronze internal parts and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve that opens under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.

# **PART 3 EXECUTION**

## **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Install floor cleanouts at elevation to accommodate finished floor.
- D. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on hoses, heating system feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.
- E. Pipe relief from backflow preventer to nearest drain.

END OF SECTION

## **SECTION 15410 PLUMBING FIXTURES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Water closets.
- B. Urinals.
- C. Lavatories.
- D. Sinks.
- E. Service sinks.
- F. Electric water coolers.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 15145 - Plumbing Piping.

#### **1.3 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI Z358.1 - American National Standard for Emergency Eyewash and Shower Equipment; 2009.
- C. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; The American Society of Mechanical Engineers; 1997 (Reaffirmed 2002).
- D. ASME A112.18.1 - Plumbing Supply Fittings; The American Society of Mechanical Engineers; 2012.
- E. ASME A112.19.2 - Ceramic Plumbing Fixtures; The American Society of Mechanical Engineers; 2013.
- F. ASME A112.19.5 - Flush Valves and Spuds for Water-Closet Bowls, Urinals, and Tanks; The American Society of Mechanical Engineers; 2011.
- G. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2004.
- H. NSF 61 - Drinking Water System Components - Health Effects; 2014.
- I. NSF 372 - Drinking Water System Components - Lead Content; 2011.

#### **1.4 SUBMITTALS**

- A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- B. Manufacturer's Instructions: Indicate installation methods and procedures.
- C. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

## **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with documented experience acceptable to the A/E.

## **1.6 REGULATORY REQUIREMENTS**

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

## **PART 2 PRODUCTS**

### **2.1 GENERAL**

- A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Furnish and install fixtures complete with all supplies, chrome escutcheons, waste and vent connections, fittings, carriers, hangers and supports, bolt caps, faucets, valves and traps. All trim, shall be brass with polished chrome finish. Traps shall be 17 gauge chrome plated cast brass with cleanout plug.
- C. Provide key type chrome plated angle stops for each lavatory, sink or tank type fixture. Locate stops in accessible location below fixture.
- D. Fixtures shall be in accordance with ASME A112.18, ASME A112.19 and 2010 ASAD, 09/15/2010 (CPSM 4.2).

### **2.2 TANK TYPE WATER CLOSETS**

- A. Bowl:
  - 1. ASME A112.19.2M; floor mounted, vitreous china reverse trap, close-coupled closet combination with elongated rim, height as indicated on drawings, insulated vitreous china closet tank with fittings and lever flushing valve, bolt caps.
  - 2. Water Consumption:
    - a. Maximum 1.6 gallons per flush.
- B. Seat: Solid white plastic, open front, extended back, less cover, complete with self-sustaining hinge.

### **2.3 WALL HUNG URINALS**

- A. Urinals: Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier.
  - 1. Flush Volume: 1.0 gallons, maximum.
  - 2. Flush Valve: Exposed (top spud).
  - 3. Flush Operation: Manual, oscillating handle.
  - 4. Trap: Integral.
- B. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
  - 1. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.
- C. Carriers:

1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

## **2.4 LAVATORIES**

### **A. Vitreous China Wall Hung Basin:**

1. ASME A112.19.2M; vitreous china wall hung lavatory, with 4 inch high back, rectangular basin with splash lip, front overflow, and soap depression.
  - a. Drilling Centers: 4 inch.

### **B. Supply Faucet: ASME A112.18.1; chrome plated combination supply fitting with open grid strainer, water economy aerator with maximum flow of 0.5 gallon per minute (low-flow), single lever handle.**

### **C. Accessories:**

1. Wall Carrier.
  - a. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, concealed arm supports, bearing plate and studs.

## **2.5 SINKS**

### **A. Double Compartment Bowl:**

1. ASME A112.19.3; 20 gage thick, Type 304 stainless steel, self rimming and undercoated, with ledge back drilled for trim.
  - a. Drain: 3-1/2 inch crumb cup and tailpiece.

### **B. Faucet: ASME A112.18.1; chrome plated brass supply with swing spout, water economy aerator with maximum 2.2 gpm flow, single lever handle and retractable spray.**

## **2.6 ELECTRIC WATER COOLERS**

### **A. Water Cooler:**

1. ARI 1010; surface handicapped mounted, ADA dual-height electric water cooler with stainless steel top, powder coated galvanized steel body, elevated anti-squirt bubbler with stream guard, automatic stream regulator, push button, mounting bracket, refrigerated with integral air cooled condenser, 8 gallon per hour minimum of chilled water. Provide with bottle filler.

## **2.7 SERVICE SINKS**

### **A. Bowl:**

1. 24 x 24 x 10 inch high, rounded corner unit, white molded stone, floor mounted, with one inch wide shoulders, vinyl bumper guard, stainless steel strainer.

### **B. Trim:**

1. ASME A112.18.1 exposed wall type supply with lever handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges.



- C. Accessories:
  - 1. 5 feet of 1/2 inch diameter plain end reinforced plastic hose.
  - 2. Hose clamp hanger.
  - 3. Mop hanger.

## **2.8 ELECTRIC WATER HEATERS**

- A. Type: Commercial, automatic, electric, vertical storage.
- B. Tank: Glass lined welded steel, thermally insulated with one inch thick foam plastic; encased in corrosion-resistant steel jacket; baked-on enamel finish.
- C. Controls: Automatic water thermostat with adjustable temperature range from 110 to 140 degrees F, flanged or screw-in nichrome elements, enclosed controls and electrical junction box.
- D. Accessories: Provide:
  - 1. Water Connections: Brass.
  - 2. Dip tube: Brass.
  - 3. Drain Valve.
  - 4. Anode: Magnesium
  - 5. Temperature and Pressure Relief Valve: ASME labelled.
  - 6. Thermal Expansion Tank: Steel shell rated for 200F and 150 PSI for potable, closed water system, NSF 61 heavy duty butyl diaphragm, polypropylene liner, air charging valve.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.

### **3.2 PREPARATION**

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

### **3.3 INSTALLATION**

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.
- C. Install components level and plumb.

### **3.4 ADJUSTING**

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

### **3.5 CLEANING**

- A. Clean plumbing fixtures and equipment.

END OF SECTION

**SECTION 15733**  
**VRF MULTI-SPLIT SYSTEM**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Variable refrigerant flow HVAC system includes but is not limited to:
  - 1. Outdoor/Heat Pump unit.
  - 2. Indoor/Evaporator units.
  - 3. Branch Box.
  - 4. Refrigerant piping.
  - 5. Control panels.
  - 6. Control wiring.

**1.2 REFERENCE STANDARDS**

- A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; Air-Conditioning, Heating, and Refrigeration Institute; 2008.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association 2014
- C. UL 1995 - Heating and Cooling Equipment; Current Edition, Including All Revisions.

**1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's standard data sheets showing the following for each item of equipment, marked to correlate to equipment item markings shown in the contract documents:
  - 1. Outdoor/Central Units:
    - a. Refrigerant Type and Size of Charge.
    - b. Cooling Capacity: Btu/h.
    - c. Heating Capacity: Btu/h.
    - d. Cooling Input Power: Btu/h.
    - e. Heating Input Power: Btu/h.
    - f. Operating Temperature Range, Cooling and Heating.
    - g. Air Flow: Cubic feet per minute.
    - h. Fan Curves.
    - i. External Static Pressure (ESP): Inches WG.
    - j. Sound Pressure Level: dB(A).
    - k. Electrical Data:
      - 1) Maximum Circuit Amps (MCA).
      - 2) Maximum Fuse Amps (MFA).
      - 3) Maximum Starting Current (MSC).
      - 4) Full Load Amps (FLA).
      - 5) Total Over Current Amps (TOCA).
      - 6) Fan Motor: HP.
    - l. Weight and Dimensions.

- m. Maximum number of indoor units that can be served.
  - n. Maximum refrigerant piping run from outdoor/condenser unit to indoor/evaporator unit.
  - o. Maximum height difference between outdoor/condenser unit to indoor/evaporator unit, both above and below.
  - p. Control Options.
2. Indoor/Evaporator Units:
    - a. Cooling Capacity: Btu/h.
    - b. Heating Capacity: Btu/h.
    - c. Cooling Input Power: Btu/h.
    - d. Heating Input Power: Btu/h.
    - e. Air Flow: Cubic feet per minute.
    - f. Fan Curves.
    - g. External Static Pressure (ESP): Inches WG.
    - h. Sound Pressure level: dB(A).
    - i. Electrical Data:
      - 1) Maximum Circuit Amps (MCA).
      - 2) Maximum Fuse Amps (MFA).
      - 3) Maximum Starting Current (MSC).
      - 4) Full Load Amps (FLA).
      - 5) Total Over Current Amps (TOCA).
      - 6) Fan Motor: HP.
    - j. Maximum Lift of Built-in Condensate Pump.
    - k. Weight and Dimensions.
    - l. Control Options.
  3. Control Panels: Complete description of options, control points, zones/groups.
- B. Shop Drawings: Installation drawings custom-made for this project; include as-designed HVAC layouts, locations of equipment items, refrigerant piping sizes and locations, condensate piping sizes and locations, remote sensing devices, control components, electrical connections, control wiring connections. Include:
1. Detailed piping diagrams, with branch balancing devices.
  2. Condensate piping routing, size, and pump connections.
  3. Detailed power wiring diagrams.
  4. Detailed control wiring diagrams.
  5. Refrigerant charge.
  6. Locations of required access through fixed construction.
  7. Drawings required by manufacturer.
- C. Operating and Maintenance Data:
1. Manufacturer's complete standard instructions for each unit of equipment and control panel.
  2. Custom-prepared system operation, troubleshooting, and maintenance instructions and recommendations.
  3. Identification of replaceable parts and local source of supply.

- D. Project Record Documents: Record the following:
  - 1. As-installed routing of refrigerant piping and condensate piping.
  - 2. Locations of access panels.
  - 3. Locations of control panels.

E. Warranty: Executed warranty, made out in Owner's name.

#### **1.4 QUALITY ASSURANCE**

A. Manufacturer Qualifications:

- 1. Company that has documented experience manufacturing variable refrigerant volume heat pump equipment, acceptable to the A/E.
- 2. Company that provides system design software to installers.

B. Design and installation requirements:

- 1. System shall be designed by a certified Diamond Designer approved by the manufacturer.
- 2. System shall be installed by a contractor that has successfully completed the manufacturer's three day service course.
- 3. System shall be verified with a completed commissioning report submitted to and approved by the manufacturer.

C. Installer Qualifications: Trained and approved by manufacturer of equipment.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

A. Deliver, store, and handle equipment and refrigerant piping according to manufacturer's recommendations.

#### **1.6 WARRANTY**

- A. All equipment, controls and devices shall be covered by an extended manufacturer's limited warranty for a period of five (5) years from date of installation.
- B. Compressors: Provide manufacturer's warranty for seven (7) years from date of installation. All warranty service work shall be preformed by a factory trained service professional.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design: The system shown in the contract documents is based on equipment and system designed by Mitsubishi.
- B. Systems designed and manufactured by Daikin and Panasonic will be considered under the terms described for substitutions as "equals", in accordance with General Conditions:
  - 1. Substitution requests will be considered only if required shop drawing data is complete and submitted with the request.
  - 2. Substitution request shall include a list of all features, capacities, ratings and options that differ from the specified equipment/system.

3. Contractor (not equipment supplier) shall certify that the use of the substitute system and equipment will not require additional costs to the owner, changes to other work or re-design by Engineer.
4. Contractor shall certify that the substitute system will achieve the performance specified.

## **2.2 HVAC SYSTEM DESIGN**

- A. System Operation: Heating or cooling, selected at system level.
  1. Provide a complete functional system that achieves the specified performance based on the specified design conditions and that is designed and constructed according to the equipment manufacturer's requirements.
  2. Provide heating performance at low ambient as shown on the drawings.
  3. Outdoor/Condenser unit locations are shown on the drawings.
  4. Indoor/Evaporator unit locations are shown on the drawings.
  5. Branch Box unit locations are shown on the drawings.
  6. Required equipment unit capacities are shown on the drawings.
  7. Refrigerant piping sizes and locations are not shown on the drawings. Manufacturer shall design and size the refrigerant piping system and submit detail piping diagrams.
  8. Maximum refrigerant charge is shown on the drawings.
  9. Connect equipment to condensate piping; condensate piping is shown on the drawings.
- B. Refrigerant Piping Lengths: Provide equipment capable of serving system without any oil traps.
- C. Controls: Provide the following control interfaces:
  1. For Each Indoor/Evaporator Unit: One wall-mounted wireless "local" controller, with temperature sensor; locate where indicated.
  2. Provide wireless remote control kit to include wireless Receiver and wireless portable Central Controller capable of controlling all indoor units.
- D. Local Controllers: Wall-mounted, hard-wired, with temperature sensor, room temperature and setpoint temperature display, temperature adjustment capability, fan and mode controls, 2-hour override button and lock-out capability. Dual set-point capability.

## **2.3 EQUIPMENT**

- A. All Units: Factory assembled, wired, and piped and factory tested for function and safety.
  1. Refrigerant: R-410A.
  2. Performance Certification: AHRI Certified; [www.ahrinet.org](http://www.ahrinet.org).
  3. Safety Certification: Tested to UL 1995 by UL or Intertek-ETL and bearing the certification label.
  4. Provide outdoor/condensing units capable of serving indoor unit capacity of 150 percent of the actual capacity of the outdoor/condensing unit.
  5. Provide units capable of serving the zones indicated.
- B. Refrigerant Piping:

1. Refrigerant piping shall be copper, ASTM B88 in accordance with manufacturer's requirements. Piping system shall be designed and sized per the manufacturer's software design program.
2. Refrigerant Flow Balancing: Provide refrigerant piping joints and headers specifically designed to ensure proper refrigerant balance and flow for optimum system capacity and performance.
3. Provide ball valves for each indoor unit at the Branch Box.
4. Insulate each refrigerant line individually between the condensing and indoor units. Insulation thickness shall be 1" minimum.

## **2.4 OUTDOOR/HEAT PUMP UNITS**

- A. Outdoor/Heat Pump Units: Air-cooled DX refrigeration units, designed specifically for use with indoor/evaporator units; factory assembled and wired with all necessary electronic and refrigerant controls.
  1. Refrigeration Circuit: Scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant regulator. Service ports located outdoors shall be fitted with locking-type tamper-resistant caps or shall be otherwise secured to prevent unauthorized access.
  2. Variable Volume Control: Modulate compressor capacity automatically to maintain constant suction and condensing pressures while varying refrigerant volume to suit heating/cooling loads.
  3. Power Failure Mode: Automatically restart operation after power failure without loss of programmed settings.
  4. Safety Devices: High pressure sensor and switch, low pressure sensor/switch, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
- B. Unit Cabinet: Weatherproof and corrosion resistant; rust-proofed mild steel panels coated with powder coated baked enamel finish.
- C. Fans: One or more direct-drive propeller type, horizontal discharge, with variable speed operation.
  1. Fan Motors: Factory installed; permanently lubricated bearings; inherent overload protection; fan guard; output as indicated for specific equipment.
- D. Condenser Coils:
  1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
  2. The coil fins shall have a factory applied corrosion resistant blue-fin finish.
  3. The coil shall be protected with an integral metal guard.
  4. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.

- E. Compressors: Scroll type, hermetically sealed, variable speed inverter-driven; capable of controlling capacity within range of 16 percent to 100 percent of total capacity.
  - 1. Provide each compressor with crankcase heater, high pressure safety switch, and internal thermal overload protector.
  - 2. Provide oil separators and intelligent oil management system.
  - 3. Provide vibration isolators.

## **2.5 BRANCH BOX**

- A. The Branch Box shall control refrigerant flow to each indoor unit. Provide with 5 ports minimum.
- B. Service shut-off valves shall be field-provided/installed for each branch to allow service to any indoor unit without field interruption to overall system operation.
- C. Linear electronic expansion valves shall be used to control the variable refrigerant flow.

## **2.6 INDOOR/EVAPORATOR UNITS**

- A. All Indoor/Evaporator Units: Factory assembled and tested DX fan-coil units, with electronic proportional expansion valve, control circuit board, factory wiring and piping, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.
  - 1. Refrigerant: Refrigerant circuits factory-charged with dehydrated air, for field charging.
  - 2. Temperature Control Mechanism: Return air thermistor and computerized Proportional-Integral-Derivative (PID) control of superheat.
  - 3. Coils: Direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond; waffle louver fin and high heat exchange, rifled bore tube design; factory tested.
    - a. Provide thermistor on liquid and gas lines.
  - 4. Fans: Direct-drive, with statically and dynamically balanced impellers; high, medium and low speeds unless otherwise indicated; motor thermally protected.
  - 5. Return Air Filter: Washable long-life net filter with mildew proof resin, unless otherwise indicated.
  - 6. Condensate Drainage: Built-in condensate drain pan with PVC drain connection.
    - a. Units With Built-In Condensate Pumps: Provide condensate safety shutoff and alarm.
    - b. Units Without Built-In Condensate Pump: Provide built-in condensate float switch and wiring connections.
  - 7. Cabinet Insulation: Sound absorbing foamed polystyrene and polyethylene insulation.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that required electrical services have been installed and are in the proper locations prior to starting installation.
- B. Verify that condensate piping has been installed and is in the proper location prior to starting installation.

### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install refrigerant piping in accordance with equipment manufacturer's instructions. All piping shall be concealed in walls, below floors or above ceilings.
- C. Perform wiring in accordance with NFPA 70, National Electric Code (NEC).
- D. Coordinate with installers of systems and equipment connecting to this system.

### **3.3 FIELD QUALITY CONTROL**

- A. Provide manufacturer's field representative to inspect installation prior to startup.

### **3.4 SYSTEM STARTUP**

- A. Provide manufacturer's field representative to perform system startup.
- B. Prepare and start equipment and system in accordance with manufacturer's instructions and recommendations.
- C. Adjust equipment for proper operation within manufacturer's published tolerances.

### **3.5 CLEANING**

- A. Clean exposed components of dirt, finger marks, and other disfigurements.

### **3.6 CLOSEOUT ACTIVITIES**

- A. Demonstration: Demonstrate operation of system to Owner's personnel.
  - 1. Use operation and maintenance data as reference during demonstration.
  - 2. Conduct walking tour of project.
  - 3. Briefly describe function, operation, and maintenance of each component.
- B. Training: Train Owner's personnel on operation and maintenance of system.
  - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
  - 2. Instructor: Manufacturer's training personnel.
  - 3. Location: At project site.

END OF SECTION



## **SECTION 15810 DUCTS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Metal ductwork.
- B. Nonmetal ductwork.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 15820 - Duct Accessories.
- B. Section 15850 - Air Outlets and Inlets.
- C. Section 15950 - Testing, Adjusting, and Balancing.

#### **1.3 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.
- E. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

#### **1.4 SUBMITTALS**

- A. Product Data: Provide data for duct materials and duct connections.
- B. Shop Drawings: Indicate duct configuration, dimensions and connections.

#### **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with documented experience acceptable to the A/E.

#### **1.6 FIELD CONDITIONS**

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

### **PART 2 PRODUCTS**

#### **2.1 MATERIALS**

- A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

- B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
  - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
  - 2. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
  - 3. For Use With Flexible Ducts: UL labeled.
- C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
- D. All Ducts: Galvanized steel, unless otherwise indicated, 2 inch w.g. pressure class.

## **2.2 DUCTWORK FABRICATION**

- A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
- B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- C. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.
- D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- E. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide gradual duct increase in size to match the louver size. Slope bottom of duct to drain any water infiltration.

## **2.3 MANUFACTURED DUCTWORK AND FITTINGS**

- A. Flexible Ducts: Two ply vinyl film supported by helically wound spring steel wire.
  - 1. Insulation: Fiberglass insulation with polyethylene vapor barrier film.
  - 2. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
  - 3. Maximum Velocity: 4000 fpm.
  - 4. Temperature Range: Minus 10 degrees F to 160 degrees F.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install, support, and seal ducts in accordance with SMACNA (DCS), minimum Class A.
- B. All joints, longitudinal and transverse seams and connections shall be securely fastened and sealed (SMACNA seal Class A) in accordance with the Virginia Mechanical Code and Energy Code. Closure systems shall be listed and marked per the applicable UL 181 requirements.

- C. Install in accordance with manufacturer's instructions.
- D. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- E. Flexible Ducts: Connect to metal ducts with draw bands.
- F. Duct sizes indicated are inside clear dimensions. For ductwork with inner acoustic liner, adjust sheet metal dimensions to accommodate liner thickness.
- G. Provide openings in ductwork where required to accommodate sensors, thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal cap with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- H. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- I. Use double nuts and lock washers on threaded rod supports.
- J. Use of chain, wire or perforated strap hangers; use of wood blocking, stays and bracing; or, use of hangers suspended from piping above will not be permitted.
- K. Install flexible duct without sags or kinks and max length of 8'. Support at 4' max intervals with 1" wide band that will not damage insulation.
- L. At exterior wall louvers, slope duct down toward louver.

END OF SECTION

**SECTION 15820**  
**DUCT ACCESSORIES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Air turning devices/extractors.
- B. Duct access doors.
- C. Duct test holes.
- D. Flexible duct connections.
- E. Volume control dampers.

**1.2 RELATED REQUIREMENTS**

- A. Section 15810 - Ducts.

**1.3 REFERENCE STANDARDS**

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association; 2015.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

**1.4 SUBMITTALS**

- A. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with documented experience acceptable to the A/E.

**PART 2 PRODUCTS**

**2.1 AIR TURNING DEVICES/EXTRACTORS**

- A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

**2.2 DUCT ACCESS DOORS**

- A. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1-inch-thick insulation with sheet metal cover.
  - 1. Less Than 12 inches Square: Secure with sash locks.
  - 2. Up to 18 inches Square: Provide two hinges and two sash locks.
- B. Access doors with sheet metal screw fasteners are not acceptable.

**2.3 DUCT TEST HOLES**

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

## **2.4 FLEXIBLE DUCT CONNECTIONS**

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
  - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
    - a. Net Fabric Width: Approximately 2 inches wide.

## **2.5 VOLUME CONTROL DAMPERS**

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.
- C. Quadrants:
  - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
  - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 15810 for duct construction and pressure class.
- B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 16 x 16 inch size for shoulder access, and as indicated. Provide 4 x 4 inch for balancing dampers only. Review locations prior to fabrication.
- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. At ducted indoor units, fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- E. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- F. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- G. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

## SECTION 15835

### POWER VENTILATORS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Ceiling and Cabinet fans.

##### 1.2 RELATED REQUIREMENTS

- A. Section 15820 - Duct Accessories: Backdraft dampers.

##### 1.3 REFERENCE STANDARDS

- A. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; Air Movement and Control Association International, Inc.; 2007 (ANSI/AMCA 210, same as ANSI/ASHRAE 51).
- B. UL 705 - Power Ventilators; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

##### 1.4 SUBMITTALS

- A. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- B. Manufacturer's Instructions: Indicate installation instructions.
- C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

##### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with documented experience acceptable to the A/E.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

##### 1.6 FIELD CONDITIONS

- A. Permanent ventilators may not be used for ventilation during construction.

#### PART 2 PRODUCTS

##### 2.1 CABINET AND CEILING EXHAUST FANS

- A. Centrifugal Fan Unit: UL Listed, direct driven with galvanized steel housing, backward inclined wheel, square or round duct collars, resilient mounted motor.
- B. Disconnect Switch: Plug-in type.
- C. Grille: Molded white plastic.

#### PART 3 EXECUTION

##### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

- B. Hung Cabinet Fans:
  - 1. Install flexible connections specified in Section 15820 between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.
- C. Provide backdraft dampers on outlet from cabinet and ceiling exhausters fans and as indicated.

END OF SECTION

## SECTION 15850

### AIR OUTLETS AND INLETS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Diffusers.
- B. Registers/grilles.
- C. Louvers.

##### 1.2 RELATED REQUIREMENTS

- A. Section - Interior Painting: Painting of ducts visible behind outlets and inlets.

##### 1.3 SUBMITTALS

- A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

##### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with documented experience acceptable to the A/E.

#### PART 2 PRODUCTS

##### 2.1 MANUFACTURERS

- A. MetalAire: [www.metalaire.com](http://www.metalaire.com).
- B. Krueger: [www.krueger-hvac.com](http://www.krueger-hvac.com).
- C. Price Industries: [www.price-hvac.com](http://www.price-hvac.com).
- D. Titus: [www.titus-hvac.com](http://www.titus-hvac.com).

##### 2.2 RECTANGULAR/SQUARE CEILING DIFFUSERS (CD)

- A. Type: MetalAire 5000 or approved equal, Square and rectangular, adjustable pattern, multi-louvered diffuser to discharge air in four way pattern unless indicated otherwise.
- B. Frame: Inverted T-bar type for lay-in ceilings. Surface mount in gypsum ceilings or in center of ceiling tile for small rooms with limited full size tiles. Coordinate with final Reflected Ceiling Plan and Ceiling Finish Schedule prior to ordering frame type.
- C. Fabrication: Aluminum extruded louvers with baked enamel off-white finish.
- D. Accessories: Radial opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

##### 2.3 CEILING RETURN GRILLES (CG)

- A. Type: MetalAire RH, Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, 45 degree blades, horizontal face.



- B. Frame: 1 inch margin with countersunk screw mounting to return duct. Where indicated as CG22, provide frame for lay-in T-bar ceiling.
- C. Fabrication: Aluminum extrusions, with factory off-white enamel finish.

## **2.4 LOUVERS**

- A. Type: 4 inch deep with blades on 45 degree slope, heavy channel frame, 1/2 inch square mesh screen over exhaust and 1/2 inch square mesh screen over intake.
- B. Color: To be selected by A/E from manufacturer's standard range.
- C. Fabrication: 12 gage, 0.1046 inch thick extruded aluminum, welded assembly, with factory fluoropolymer spray finish.
- D. Mounting: Furnish with interior angle flange and coordinate mounting with wall construction. Seal penetration with commercial grade polyurethane sealant.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Confirm existing conditions and sizes of brick walls prior to ordering louvers and brick vents.
- D. Install diffusers, registers and grille to ductwork with air tight connection.
- E. Insulate top of ceiling supply diffusers.
- F. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- G. Paint ductwork visible behind air outlets and inlets matte black.

END OF SECTION

## SECTION 15950

### TESTING, ADJUSTING, AND BALANCING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of refrigerating systems.
- C. Measurement of final operating condition of HVAC systems.

##### 1.2 REFERENCE STANDARDS

- A. AABC MN-1 - AABC National Standards for Total System Balance; Associated Air Balance Council; 2002.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 2008.
- C. NEBB (TAB) - Procedural Standard for Testing Adjusting and Balancing of Environmental Systems; National Environmental Balancing Bureau; 2005, Seventh Edition.

##### 1.3 SUBMITTALS

- A. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
  - 1. Include at least the following in the plan:
    - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
    - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
    - c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
    - d. Final test report forms to be used.
    - e. Procedures for formal deficiency reports, including scope, frequency and distribution.
- B. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
  - 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
  - 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.
  - 3. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
6. Units of Measure: Report data in I-P (inch-pound) units only.
7. Test Reports: Indicate data on AABC MN-1 forms, forms prepared following ASHRAE Std 111, or NEBB forms.

#### **1.4 WARRANTY**

- A. Furnish AABC National Performance Guaranty for this project.

### **PART 2 PRODUCTS - NOT USED**

### **PART 3 EXECUTION**

#### **3.1 GENERAL REQUIREMENTS**

- A. Perform total system balance in accordance with one of the following:
  1. AABC MN-1, AABC National Standards for Total System Balance.
  2. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
  1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
  2. Certified by one of the following:
    - a. AABC, Associated Air Balance Council: [www.aabchq.com](http://www.aabchq.com); upon completion submit AABC National Performance Guaranty.
    - b. NEBB, National Environmental Balancing Bureau: [www.nebb.org](http://www.nebb.org).
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

#### **3.2 EXAMINATION**

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
  1. Systems are started and operating in a safe and normal condition.
  2. Temperature control systems are installed complete and operable.
  3. Proper thermal overload protection is in place for electrical equipment.
  4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
  5. Duct systems are clean of debris.
  6. Fans are rotating correctly.
  7. Fire and volume dampers are in place and open.
  8. Air coil fins are cleaned and combed.

9. Access doors are closed and duct end caps are in place.
  10. Air outlets are installed and connected.
  11. Duct system leakage is minimized.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
  - C. Beginning of work means acceptance of existing conditions.

### **3.3 PREPARATION**

- A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
- B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.
- C. Provide additional balancing devices as required.

### **3.4 ADJUSTMENT TOLERANCES**

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

### **3.5 RECORDING AND ADJUSTING**

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

### **3.6 AIR SYSTEM PROCEDURE**

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for minimum and maximum design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at minimum and maximum conditions.

### **3.7 SCOPE**

- A. Test, adjust, and balance the following:
  - 1. Fan Coil Indoor Units
  - 2. Terminal Heat Transfer Units
  - 3. Outdoor Heatpump and Condensing Units
  - 4. VRF System
  - 5. Fans
  - 6. Air Filters
  - 7. Air Inlets and Outlets

END OF SECTION

## **DIVISION 16 - ELECTRICAL**

### **SECTION 16050**

#### **BASIC ELECTRICAL REQUIREMENTS**

##### **PART 1 GENERAL**

###### **1.1 SECTION INCLUDES**

- A. Basic Electrical Requirements specifically applicable to Division 16 Sections, in addition to Division 1 - General Requirements.

###### **1.2 REFERENCES**

- A. NFPA 70 – 2011 National Electrical Code 2011 Edition.

###### **1.3 SUBMITTALS**

- A. Submit under provisions of Section 01720.
- B. Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittals.
- C. Mark dimensions and values in units to match those specified.

###### **1.4 REGULATORY REQUIREMENTS**

- A. Electrical: Conform to NFPA 70.
- B. Obtain permits, and request inspections from authority having jurisdiction.

###### **1.5 PROJECT/SITE CONDITIONS**

- A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Owner before proceeding.

###### **1.6 SHOP DRAWINGS**

- A. Submit Shop Drawings for the following items: Devices and Cabinets/Enclosures.
- B. Submit under the provisions of Section 01300.

## **1.7 GUARANTEE**

- A. All materials and workmanship shall be guaranteed to be free from defects for a period of one (1) year from date of acceptance and Contractor shall make good, without additional cost to the Owner, any defects which may appear within that period. Manufacturer's warranties extending beyond one year shall be processed and turned over to the Owner.

## **1.8 FINAL CLEANING**

- A. Execute final cleaning prior to final project assessment.
- B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- C. Remove waste and surplus materials, rubbish, and construction facilities from the site.
- D. Clearly mark the installation date on the interior of each disconnect switch.

## **1.9 OPERATION AND MAINTENANCE DATA**

- A. Submit under the provisions of Section 01730.

## **1.10 WARRANTIES**

- A. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.
- B. Provide Table of Contents and assemble in binder with durable plastic or cloth cover.
- C. Submit prior to final Application for Payment.
- D. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

## **1.11 SPARE PARTS AND MAINTENANCE MATERIALS**

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

**PART 2 PRODUCTS**

Not Used

**PART 3 EXECUTION**

Not Used

END OF SECTION



## SECTION 16060

### GROUNDING AND BONDING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Grounding and bonding components.
- B. Provide all components necessary to complete the grounding system(s) consisting of:
  - 1. Metal underground water pipe when available.
  - 2. Rod electrodes.
  - 3. Concrete Encased Electrode

##### 1.2 REFERENCES

- A. NFPA 70 – 2011 National Electrical Code (NEC); National Fire Protection Association.

##### 1.3 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 5 ohms.

##### 1.4 SUBMITTALS

- A. Product Data: Provide for grounding electrodes and connections.
- B. Test Reports: Indicate overall resistance to ground and resistance of each electrode.
- C. Project Record Documents: Record actual locations of components and grounding electrodes.

##### 1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

#### PART 2 PRODUCTS

##### 2.1 ELECTRODES

- A. Rod Electrodes: Copper.

1. Diameter: 3/4 inch.
2. Length: 10 feet.

## **2.2 CONCRETE ENCASED ELECTRODE**

- A. BARE CONDUCTOR: Copper.
1. Diameter: #4 AWG OR LARGER.
  2. Length: Minimum 20 feet.

## **2.3 CONCRETE ENCASED ELECTRODE - ALTERNATE TO BARE COPPER ABOVE : STEEL REINFORCING BAR OR ROD**

- A. REINFORCING BAR OR ROD: STEEL.
1. Diameter: Greater than 1/2 " DIAMETER.
  2. Length: Minimum 20 feet.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that final backfill and compaction has been completed before driving rod electrodes.

### **3.2 INSTALLATION**

- A. Install ground electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.
- B. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing where indicated. Bond steel together.
- C. Provide bonding to meet requirements described in Quality Assurance.
- D. Bond together each pipe, duct and other metal object entering or within the building.. Use 2/0 AWG bare copper conductor.
- E. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

END OF SECTION

## SECTION 16070

### HANGERS AND SUPPORTS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Conduit and equipment supports.
- B. Anchors and fasteners.

##### 1.2 REFERENCES

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.
- B. NFPA 70, 2011 National Electrical Code (NEC); National Fire Protection Association.

##### 1.3 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

#### PART 2 PRODUCTS

##### 2.1 MATERIALS

- A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
- B. Supports: Fabricated of structural steel or formed steel members; galvanized.
- C. Anchors and Fasteners:
  - 1. Obtain permission from A/E before using powder-actuated anchors.
  - 2. Concrete Structural Elements: Use precast inserts, expansion anchors, powder-actuated anchors, or preset inserts.
  - 3. Steel Structural Elements: Use beam clamps, steel spring clips, steel ramset fasteners, or welded fasteners.
  - 4. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
  - 5. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
  - 6. Solid Masonry Walls: Use expansion anchors or preset inserts.
  - 7. Sheet Metal: Use sheet metal screws.
  - 8. Wood Elements: Use wood screws.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.
  - 1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
- B. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- C. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- D. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.
- E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

## **SECTION 16075**

### **ELECTRICAL IDENTIFICATION**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Nameplates and labels.
- B. Wire and cable markers.

##### **1.2 REFERENCES**

- A. NFPA 70 – 2011 National Electrical Code (NEC); National Fire Protection Association.

##### **1.3 SUBMITTALS**

- A. Product Data: Provide catalog data for nameplates, labels, and markers.

##### **1.4 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

#### **PART 2 PRODUCTS**

##### **2.1 WIRE MARKERS**

- A. Description: tape, split sleeve, or tubing type wire markers.
- B. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, and junction boxes each load connection.
- C. Legend:
  - 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
  - 2. Control Circuits: Control wire number indicated on shop drawings.

##### **2.2 UNDERGROUND WARNING TAPE**

- A. Description: 4 inch wide plastic tape, detectable type colored red with suitable warning legend describing buried electrical lines.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Degrease and clean surfaces to receive nameplates and labels.

### **3.2 INSTALLATION**

- A. Install nameplates and labels parallel to equipment lines.
- B. Secure nameplates to equipment front using screws.
- C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify all underground conduits using underground warning tape. Install one tape per trench at 12 inches below finished grade.

END OF SECTION

## **SECTION 16123**

### **BUILDING WIRE AND CABLE**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Wire and cable for 600 volts and less.
- B. Wiring connectors and connections.

##### **1.2 RELATED SECTIONS**

- A. Section 16075 - Electrical Identification.

##### **1.3 REFERENCES**

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.
- B. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association.
- C. NFPA 70 - National Electrical Code; National Fire Protection Association; 2011.

##### **1.4 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Test Reports: Indicate procedures and values obtained.
- C. Project Record Documents: Record actual locations of components and circuits.

##### **1.5 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Products: Furnish products listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

#### **PART 2 PRODUCTS**

##### **2.1 WIRING REQUIREMENTS**

- A. Concealed Dry Interior Locations: Use only building wire in raceway.
- B. Exposed Dry Interior Locations: Use only building wire in raceway.

- C. Above Accessible Ceilings: Use only building wire in raceway.
- D. Wet or Damp Interior Locations: Use only building wire in raceway.
- E. Exterior Locations: Use only building wire in raceway.
- F. Underground Installations: Use only building wire with Type THWN or XHHW insulation in raceway.
- G. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
- H. Use conductor not smaller than 12 AWG for power and lighting circuits.
- J. Use conductor not smaller than 16 AWG for control circuits.
- K. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.

## **2.2 BUILDING WIRE**

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: NFPA 70, Type THHN/THWN.

## **2.3 CONDUCTOR AND CABLE GENERAL REQUIREMENTS**

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose indicated.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- E. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- F. Conductor Material:
  - 1. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
  - 2. Tinned Copper Conductors: Comply with ASTM B33.
- G. Conductor Color Coding:
  - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
  - 2. Color Coding Method: Integrally colored insulation.
    - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
  - 3. Color Code:



- a. 208/120 V, 1 Phase, 3 Wire System:
  - 1) Phase A: Black.
  - 2) Phase B: Red.
  - 3) Phase C: Blue.
  - 4) Neutral/Grounded: White
- b. Equipment Ground, All Systems: Green.
- c. Travelers for 3-Way and 4-Way Switching: Pink.
- d. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.
- f. For control circuits, comply with manufacturer's recommended color code.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.
- C. Verify that raceway installation is complete and supported.

### **3.2 PREPARATION**

- A. Completely and thoroughly swab raceway before installing wire.

### **3.3 INSTALLATION**

- A. Install wire securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Use wiring methods indicated.
- C. Pull all conductors into raceway at same time.
- D. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- E. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- F. Clean conductor surfaces before installing lugs and connectors.
- G. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- H. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- I. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- J. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

- K. Identify and color code wire and cable under provisions of Section 16075. Identify each conductor with its circuit number or other designation indicated.

### **3.4 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA STD ATS, except Section 4.
- B. Perform inspections and tests listed in NETA STD ATS, Section 7.3.2.

END OF SECTION

## **SECTION 16131**

### **CONDUIT**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Conduit, fittings and conduit bodies.

##### **1.2 RELATED SECTIONS**

- A. Section 16060 - Grounding and Bonding.
- B. Section 16070 - Hangers and Supports.
- C. Section 16075 - Electrical Identification.

##### **1.3 REFERENCES**

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC).
- B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT).
- C. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.
- D. NECA 101 - Standard for Installing Steel Conduit (Rigid, IMC, EMT); National Electrical Contractors Association.
- E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association.
- F. National Electrical Code (NEC) 2011.

##### **1.4 QUALITY ASSURANCE**

- A. Conform to requirements of 2011 NEC.

##### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Accept conduit on site. Inspect for damage.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

## **PART 2 PRODUCTS**

### **2.1 CONDUIT REQUIREMENTS**

- A. Conduit Size: Comply with NFPA 70.
  - 1. Minimum Size: 3/4 inch unless otherwise specified.
- B. Underground Installations:
  - 1. Minimum Size: 1 inch.
- C. Outdoor Locations (Wet or Damp locations) Above Grade: Rigid steel conduit.
- D. Below Grade Outdoor: Rigid Nonmetallic Conduit, Schedule 40 PVC
- E. Wet and Damp Locations: Rigid steel conduit, Intermediate metal conduit, or electrical metallic tubing.
- F. Dry Locations:
  - 1. Concealed: Use rigid steel conduit, intermediate metal conduit, or electrical metallic tubing.
  - 2. Exposed: Use rigid steel conduit, intermediate metal conduit, or electrical metallic tubing.

### **2.2 METAL CONDUIT**

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Intermediate Metal Conduit (IMC): Rigid steel.
- C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

### **2.3 ELECTRICAL METALLIC TUBING (EMT)**

- A. Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: NEMA FB 1; steel compression type for sizes smaller than 2" and steel set screw or steel compression for sizes 2" and larger.

### **2.4 RIGID NONMETALLIC CONDUIT (PVC)**

- A. NEMA TC-2 TYPE EPC-40-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC3 and UL 514B.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify routing and termination locations of conduit prior to rough-in.
- B. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

## 3.2 INSTALLATION

- A. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1
- B. Install steel conduit as specified in NECA 101.
- C. Install nonmetallic conduit in accordance with manufacturer's instructions.
- D. Transition from nonmetallic below grade to intermediate or rigid metal conduit above grade making the transition 6" below grade.
- E. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- F. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- G. Do not attach conduit to ceiling support wires.
- H. Arrange conduit to maintain headroom and present neat appearance.
- I. Route exposed conduit parallel and perpendicular to walls.
- J. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- K. Route conduit in and under slab from point-to-point.
- L. Maintain adequate clearance between conduit and piping.
- M. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- N. Bring conduit to shoulder of fittings; fasten securely.
- O. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- P. Install no more than equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one shot bender to fabricate bends in metal conduit larger than 2 inch size.
- Q. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- R. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic.
- S. Provide suitable pull string in each empty conduit except sleeves and nipples.
- T. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- U. Identify conduit under provisions of Section 16075.

END OF SECTION

## SECTION 16138

### BOXES

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Pull and junction boxes.

##### 1.2 RELATED SECTIONS

- A. Section 16140 - Wiring Devices: Wall plates in finished areas.

##### 1.3 REFERENCES

- A. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association.
- B. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association.
- C. NFPA 70 - National Electrical Code; National Fire Protection Association; 2011.

##### 1.4 SUBMITTALS

- A. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

##### 1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Provide products listed and classified by Underwriters Laboratories, Inc., or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

#### PART 2 PRODUCTS

##### 2.1 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
  - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
- B. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.

- C. Wall Plates for Finished Areas: As specified in Section 16140.

## **2.3 PULL AND JUNCTION BOXES**

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Hinged Enclosures: As specified in Section 16139.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

### **3.2 INSTALLATION**

- A. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.
- C. Coordinate installation of outlet boxes for equipment connected.
- D. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- E. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
  - 1. Adjust box locations up to 10 feet if required to accommodate intended purpose.
- F. Orient boxes to accommodate wiring devices oriented as specified in Section 16140.
- G. Maintain headroom and present neat mechanical appearance.
- H. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- I. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- J. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- K. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- L. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- M. Use flush mounting outlet box in finished areas.

- N. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- O. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- P. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- Q. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- R. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- S. Use adjustable steel channel fasteners for hung ceiling outlet box.
- T. Do not fasten boxes to ceiling support wires.
- U. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.
- V. Use gang box where more than one device is mounted together. Do not use sectional box.
- W. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- X. Set floor boxes level.
- Y. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

### **3.3 ADJUSTING**

- A. Adjust floor boxes flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused box openings.

### **3.4 CLEANING**

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION



## **SECTION 16140 WIRING DEVICES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Wall switches.
- B. Receptacles.
- C. Wall plates.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 16060 - Grounding and Bonding.
- B. Section 16138 - Boxes.
- C. Section 16075 - Electrical Identification.

#### **1.3 REFERENCE STANDARDS**

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; Federal Specification.
- B. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.
- C. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association.
- D. NEMA WD 6 - Wiring Device -- Dimensional Requirements; National Electrical Manufacturers Association.
- E. NFPA 70 - National Electrical Code (NEC); National Fire Protection Association; 2011.
- F. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- G. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- H. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

#### **1.4 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Hubbell Incorporated: [www.hubbell-wiring.com](http://www.hubbell-wiring.com).
- B. Leviton Manufacturing Company, Inc: [www.leviton.com](http://www.leviton.com).

C. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us](http://www.legrand.us)

## 2.2 APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFI receptacles with specified weatherproof covers for all receptacles installed outdoors or in damp or wet locations.

## 2.3 ALL WIRING DEVICES

- A. Provide products listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.
- B. Finishes:
  - 1. Wiring Devices Installed in Unfinished Spaces: Gray with galvanized steel wall plate unless otherwise indicated.
  - 2. Wiring Devices Installed in Wet or Damp Locations: Ivory with specified weatherproof cover unless otherwise indicated.

## 2.4 WALL SWITCHES

- A. Weather Resistant Wall Switches: Weather resistant suitable for wet or damp locations, industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.
- B. Dual technology (passive infrared and ultrasonic) wall mount occupancy switch, 1200 watt fluorescent, selectable Automatic ON mode or Manual ON mode, selectable time delay.

## 2.5 RECEPTACLES

- A. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
  - 2. NEMA configurations specified are according to NEMA WD 6.
- B. GFI Receptacles:
  - 1. All GFI Receptacles: Provide with feed-through protection, light to indicate ground fault tripped condition and loss of protection, and list as complying with UL 943, class A.
    - a. Provide test and reset buttons of same color as device.
  - 2. Weather Resistant GFI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as

weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

## **2.6 WALL PLATES**

- A. All Wall Plates: Comply with UL 514D.
  - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
  - 2. Size: Standard.
  - 3. Screws: Metal with slotted heads finished to match wall plate finish.
- B. Stainless Steel Plates: Smooth finish 302 stainless steel.
- C. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.
- D. Weatherproof Covers for Damp Locations: Gasketed, zinc die-cast, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.
- E. Weatherproof Covers for Wet Locations: Gasketed, thermoplastic, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that final surface finishes are complete, including painting.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- E. Verify that conditions are satisfactory for installation prior to starting work.

### **3.2 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### **3.3 INSTALLATION**

- A. Perform work in a neat and workmanlike manner in accordance with NECA 1, including mounting heights specified in that standard unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 16138 as required for installation of wiring devices provided under this section.
  - 1. Mounting Heights: Unless otherwise indicated, as follows:
    - a. Wall Switches: 48 inches above finished floor.

- b. Receptacles: 18 inches above finished floor or 6 inches above counter, or for exterior locations 48 inches above finished grade.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- E. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- F. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- G. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- H. Install wall switches with OFF position down.
- I. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- J. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- K. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

### **3.4 ADJUSTING**

- A. Adjust devices and wall plates to be flush and level.

### **3.5 CLEANING**

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

**SECTION 16410**  
**CIRCUIT BREAKERS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Non-fusible switches.
  - 2. Fusible switches,
  - 3. Molded-case circuit breakers (MCCBs).
  - 4. Enclosures.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

**1.3 SUBMITTALS**

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Wiring Diagrams: For power, signal, and control wiring.
- C. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
- D. Field quality-control reports.

**1.4 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

## **PART 2 - PRODUCTS**

### **2.1 NON-FUSIBLE SWITCHES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
  
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
  
- C. Accessories:
  - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors. All switches shall have a proper sized ground terminal.
  - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  - 3. Lugs: Suitable for number, size, and conductor material.

### **2.2 FUSIBLE SWITCHES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
  
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
  
- C. Accessories:
  - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors. All switches shall have a proper sized ground terminal.
  - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  - 3. Lugs: Suitable for number, size, and conductor material.
  - 4. Fused with 250V Dual Element fuse as sized on drawings.

## **2.3 MOLDED-CASE CIRCUIT BREAKERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- D. Features and Accessories:
  - 1. Standard frame sizes, trip ratings, and number of poles.
  - 2. Lugs: Suitable for number, size, trip ratings, and conductor material.
  - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

## **2.4 ENCLOSURES**

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
  - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
  - 2. Outdoor Locations: NEMA 250, Type 3R.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Label disconnect switches indicating source of power and equipment they serve in accordance with NEC 110.22(A).
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- D. Comply with NECA 1.

### **3.2 IDENTIFICATION**

- A. Comply with requirements in Division 16 Section "Electrical Identification."
  - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

### **3.3 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
  - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.
- C. Tests and Inspections:
  - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

END OF SECTION



**SECTION 16415**  
**TRANSFER SWITCH**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes automatic transfer switches rated 600 V and less.

**1.2 SUBMITTALS**

- A. Product Data: Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.
- C. Manufacturer Seismic Qualification Certification: Submit certification that transfer switches accessories, and components will withstand seismic forces defined in Division 16 Section "Electrical Supports and Seismic Restraints." Include the following:
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
  - 2. Dimensioned Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based.
- D. Field quality-control test reports.
- E. Operation and maintenance data.

**1.3 QUALITY ASSURANCE**

- A. 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.
- B. Comply with NEMA ICS 1.
- C. Comply with NFPA 70.
- D. Comply with NFPA 99.
- E. Comply with NFPA 110.

- F. Comply with UL 1008 unless requirements of these Specifications are stricter.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Contactor Transfer Switches:
    - a. Caterpillar; Engine Div.
    - b. Emerson; ASCO Power Technologies, LP.
    - c. Generac Power Systems, Inc.
    - d. GE Zenith Controls.
    - e. Kohler Power Systems; Generator Division.
    - f. Onan/Cummins Power Generation; Industrial Business Group.
    - g. Russelectric, Inc.
    - h. Spectrum Detroit Diesel.

### **2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS**

- A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
- B. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
  - 1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
- C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.
- F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
  - 1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.

2. Switch Action: Double throw; mechanically held in both directions.
  3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.
- G. Neutral Terminal: Solid and fully rated, unless otherwise indicated.
- H. Oversize Neutral: Ampacity and switch rating of neutral path through units indicated for oversize neutral shall be double the nominal rating of circuit in which switch is installed.
- I. Battery Charger: For generator starting batteries.
1. Float type rated 2 A.
  2. Ammeter to display charging current.
  3. Fused ac inputs and dc outputs.
- J. Enclosures: General-purpose NEMA 250, Type 3R, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

### **2.3 AUTOMATIC TRANSFER SWITCHES**

- A. Comply with Level 1 equipment according to NFPA 110.
- B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.
- C. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval is adjustable from 1 to 30 seconds.
- D. Transfer Switches Based on Molded-Case-Switch Components: Comply with NEMA AB 1, UL 489, and UL 869A.
- E. In-Phase Monitor: Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase.
- F. Motor Disconnect and Timing Relay: Controls designate starters so they disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Time delay for reconnecting individual motor loads is adjustable between 1 and 60 seconds, and settings are as indicated.
- G. Programmed Neutral Switch Position: Switch operator has a programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer.
- H. Automatic Transfer-Switch Features:
1. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.

2. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
  - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
  - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
12. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
  - a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
  - b. Push-button programming control with digital display of settings.
  - c. Integral battery operation of time switch when normal control power is not available.

## 2.4 SOURCE QUALITY CONTROL

- A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Design each fastener and support to carry load. See Division 16 Section "Electrical Hangers and Supports."
- B. Identify components according to Division 16 Section "Electrical Identification."
- C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

### **3.2 CONNECTIONS**

- A. Ground equipment according to Division 16 Section "Grounding and Bonding."
- B. Connect wiring according to Division 16 Section "Building Wire and Cables."

### **3.3 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
  - 2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
  - 3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
    - a. Check for electrical continuity of circuits and for short circuits.
    - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
    - c. Verify that manual transfer warnings are properly placed.
    - d. Perform manual transfer operation.
  - 5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.
    - a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
    - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    - c. Verify time-delay settings.
    - d. Verify pickup and dropout voltages by data readout or inspection of control settings.

- e. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
- 6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
  - a. Verify grounding connections and locations and ratings of sensors.
- C. Coordinate tests with tests of generator and run them concurrently.
- D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- E. Remove and replace malfunctioning units and retest as specified above.

### **3.4 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.
- B. Coordinate this training with that for generator equipment.

END OF SECTION

**SECTION 16420**  
**ENCLOSED CONTROLLERS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes the following enclosed controllers rated 600 V and less:
  - 1. Full-voltage manual.
  - 2. Full-voltage magnetic.

**1.2 DEFINITIONS**

- A. CPT: Control power transformer.
- B. MCCB: Molded-case circuit breaker.
- C. MCP: Motor circuit protector.
- D. N.C.: Normally closed.
- E. N.O.: Normally open.
- F. OCPD: Overcurrent protective device.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of enclosed controller.
- B. Shop Drawings: For each enclosed controller. Include dimensioned plans, elevations, sections, details, and required clearances and service spaces around controller enclosures.

**1.4 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70

## **PART 2 - PRODUCTS**

### **2.1 FULL-VOLTAGE CONTROLLERS**

- A. Fractional Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
    - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
    - c. Siemens Energy & Automation, Inc.
    - d. Square D; a brand of Schneider Electric.
  - 2. Configuration: Nonreversing.
  - 3. Surface mounting.
  
- B. Magnetic Controllers: Full voltage, across the line, electrically held.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
    - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
    - c. Siemens Energy & Automation, Inc.
    - d. Square D; a brand of Schneider Electric.
  - 2. Configuration: Nonreversing.
  - 3. Contactor Coils: Pressure-encapsulated type.
    - a. Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.
  - 4. Power Contacts: Totally enclosed, double-break, silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.
  - 5. Control Circuits: 120-V ac; of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.
  - 6. Melting Alloy Overload Relays:
    - a. Inverse-time-current characteristic.
    - b. Class 10 tripping characteristic.
    - c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
  - 7. Bimetallic Overload Relays:



- a. Inverse-time-current characteristic.
  - b. Class 10 tripping characteristic.
  - c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
- 8. External overload reset push button.
- C. Combination Magnetic Controller: Factory-assembled combination of magnetic controller, OCPD, and disconnecting means.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
    - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
    - c. Siemens Energy & Automation, Inc.
    - d. Square D; a brand of Schneider Electric.
  - 2. Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
  - 3. Nonfusible Disconnecting Means:
    - a. NEMA KS 1, heavy-duty, horsepower-rated, nonfusible switch.
    - b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
    - c. Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.

## **2.2 ENCLOSURES**

- A. Enclosed Controllers: NEMA ICS 6, to comply with environmental conditions at installed location.
  - 1. Dry and Clean Indoor Locations: Type 1.
  - 2. Outdoor Locations: Type 3R.

## **2.3 ACCESSORIES**

- A. Push Buttons, Pilot Lights, and Selector Switches: NEMA ICS 5; heavy-duty type; factory installed in controller enclosure cover unless otherwise indicated.
- B. Control Relays: Auxiliary and adjustable time-delay relays.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Wall-Mounted Controllers: Install enclosed controllers on walls with tops at uniform height, and with disconnect operating handles not higher than 79 inches above finished floor, unless otherwise indicated, and by bolting units to wall or mounting on lightweight structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks complying with Division 16 Section "Hangers and Supports for Electrical Systems."
- B. Install heaters in thermal overload relays. Select heaters based on actual nameplate full-load amperes after motors have been installed.
- C. Comply with NECA 1.

### **3.2 IDENTIFICATION**

- A. Identify enclosed controllers, components, and control wiring. Comply with requirements for identification specified in Division 16 Section "Electrical Identification."
  - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  - 2. Label each enclosure with engraved nameplate.
  - 3. Label each enclosure-mounted control and pilot device.

### **3.3 CONTROL WIRING INSTALLATION**

- A. Install wiring between enclosed controllers and remote devices.
- B. Bundle, train, and support wiring in enclosures.
- C. Connect selector switches and other automatic-control selection devices where applicable.
  - 1. Connect selector switches to bypass only those manual- and automatic-control devices that have no safety functions when switch is in manual-control position.
  - 2. Connect selector switches with enclosed-controller circuit in both manual and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

### **3.4 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed controller, component, connecting supply, feeder, and control circuit.
  2. Test continuity of each circuit.
- C. Tests and Inspections:
1. Inspect controllers, wiring, components, connections, and equipment installation.
  2. Test insulation resistance for each enclosed-controller element, component, connecting motor supply, feeder, and control circuits.
  3. Test continuity of each circuit.
  4. Verify that voltages at controller locations are within plus or minus 10 percent of motor nameplate rated voltages.
  5. Test each motor for proper phase rotation.
  6. Perform each electrical test and visual and mechanical inspection stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  7. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
  8. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Enclosed controllers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION

## **SECTION 16443 PANELBOARDS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Power Distribution and Lighting/Appliance Panelboards
- B. Load centers.

#### **1.2 RELATED REQUIREMENTS**

- A. Section 16060 - Grounding and Bonding for Electrical Systems.
- B. Section 16075 - Electrical Identification.

#### **1.3 REFERENCE STANDARDS**

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.
- B. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; National Electrical Manufacturers Association.
- C. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association.
- D. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

#### **1.4 SUBMITTALS**

- A. See Section 01300 - Submittals for submittal procedures.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- C. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.

#### **1.5 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

### **PART 2 PRODUCTS**

#### **2.1 POWER DISTRIBUTION AND LIGHTING/APPLIANCE PANELBOARDS**

- A. Description: Circuit Breaker Type Panelboard.

- B. Panelboard Bus: Copper, Provide copper ground bus also in each panelboard.
- C. Minimum integrated short circuit rating: As Indicated below.
  - 1. 120/208 Volt Panelboards: 22000 amperes rms symmetrical.
- D. Mold Case Circuit Breakers: With intergral thermal and instantaneous magnetic trip in each pole: UL listed.
  - 1. Type SWD for lighting circuits.
  - 2. Ground fault interrupter circuit breakers where indicated.
- E. Controllers: AC general-purpose Class A magnetic controller rated for load served, with bimetallic overload relay.
- F. Enclosure: NEMA I enclosure
- G. Cabinet front: Surface type, fastened with concealed trim clamps, hinged door with flush lock, metal directory frame, finished in manufacturer's gray enamel.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install panelboards in accordance with NEMA PB 1.1 and NECA 1.
- B. Install panelboards plumb. Install recessed panelboards flush with wall finishes.
- C. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above finished grade or floor.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed or neatly handwritten circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide engraved plastic nameplates under the provisions of Section 16075. Provide Arc Flash Warning label in accordance with NFPA 70 110.16.
- G. Provide spare conduits out of each recessed panelboard to an accessible location Stubbed through wall. . Identify each as SPARE.
  - 1. Minimum spare conduits: 4 empty 3/4 inch.
- H. Ground and bond panelboard enclosure according to Section 16060.

### **3.2 FIELD QUALITY CONTROL**

- A. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification, except Section 4.

END OF SECTION

**SECTION 16500**  
**LIGHTING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Lighting fixtures and accessories.
- B. Lamps.

**1.2 REFERENCE STANDARDS**

- A. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2011.

**1.3 SUBMITTALS**

- A. See Section 01300 - Submittals for submittal procedures.
- B. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 001700 – Project Closeout for additional provisions.

**PART 2 PRODUCTS**

**2.1 GENERAL REQUIREMENTS FOR INTERIOR LIGHTING FIXTURES**

- A. Provide products that comply with requirements of NFPA 70 .
- B. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- C. Provide accessories and fittings as recommended by manufacturer to properly and completely install and wire fixtures.
- D. Electrical Characteristics: 120 volts, 60 Hz, unless otherwise indicated.

**2.2 FIXTURE TYPES**

- A. Furnish products as indicated in Schedule included on the Drawings.

**2.3 LAMPS**

- A. Lamp Types: As specified for each fixture.

**PART 3 EXECUTION**

**3.1 INSTALLATION**

- A. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 502 (industrial lighting).

- B. Surface Mounted Fixtures: Install plumb and square and aligned with building lines and with each other; secure to prevent movement.
- C. Install accessories furnished with each fixture.
- D. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within fixture; use flexible conduit.
- E. Bond products and metal accessories to branch circuit equipment grounding conductor.

### **3.2 FIELD QUALITY CONTROL**

- A. Operate each fixture after installation and connection. Inspect for proper connection and operation.

### **3.3 ADJUSTING**

- A. Aim and adjust fixtures as directed.

### **3.4 CLEANING**

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosures.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

### **3.5 CLOSEOUT ACTIVITIES**

- A. Demonstrate fixture operation for minimum of two hours.

### **3.6 SCHEDULE**

- A. See drawings.

END OF SECTION

## **SECTION 16521 LED EXTERIOR LIGHTING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
  - 2. Luminaire supports.

#### **1.2 DEFINITIONS**

- A. CCT: Correlated color temperature.
- B. CRI: Color rendering index.
- C. Fixture: See "Luminaire."
- D. Lumen: Measured output of lamp and luminaire, or both.
- E. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of luminaire.
- B. Shop Drawings: For nonstandard or custom luminaires.
  - 1. Include plans, elevations, sections, and mounting and attachment details.
  - 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 3. Include diagrams for power, signal, and control wiring.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Operation and maintenance data.
  - 1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
  - 2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.



## **1.5 WARRANTY**

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period 1 year from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 LUMINAIRE REQUIREMENTS**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. UL Compliance: Comply with UL 1598 and listed for wet location.
- D. L70 lamp life of 35,000 hours.
- E. Nominal Operating Voltage: 120 V ac.
- F. Lamp Rating: Lamp marked for outdoor use
- G. Source Limitations:
  - 1. Obtain luminaires from single source from a single manufacturer.
  - 2. For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

### **2.2 LUMINAIRE TYPES**

- A. Area and Site:
  - 1. Luminaire Shape: Rectangle.
  - 2. Mounting: 4" Square Steel Pole
  - 3. Luminaire-Mounting Height: 25 feet from finished grade.
  - 4. Distribution: Type II.

### **2.3 MATERIALS**

- A. Metal Parts: Free of burrs and sharp corners and edges.
- B. Sheet Metal Components: Corrosion-resistant aluminum. Form and support to prevent warping and sagging.

- C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
- D. Diffusers and Globes:
  - 1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
- E. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- F. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:
  - 1. White Surfaces: 85 percent.
  - 2. Specular Surfaces: 83 percent.
  - 3. Diffusing Specular Surfaces: 75 percent.
- G. Housings:
  - 1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
  - 2. Provide filter/breather for enclosed luminaires.

## **2.4 FINISHES**

- A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved
- B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.
- C. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
  - 1. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20 requirements; and seal aluminum surfaces with clear, hard-coat wax.
    - a. Color: Dark bronze.

## **2.5 LUMINAIRE SUPPORT COMPONENTS**

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

## **PART 3 - EXECUTION**

### **3.1 GENERAL INSTALLATION REQUIREMENTS**

- A. Comply with NECA 1.
- B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.
- C. Supports:
  - 1. Sized and rated for luminaire weight.
  - 2. Able to maintain luminaire position after cleaning and relamping.
  - 3. Support luminaires without causing deflection of finished surface.
  - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- D. Coordinate layout and installation of luminaires with other construction.
- E. Adjust luminaires that require field adjustment or aiming.

### **3.2 IDENTIFICATION**

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

### **3.3 FIELD QUALITY CONTROL**

- A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.
- B. Perform the following tests and inspections
  - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  - 2. Verify operation of photoelectric controls.
- C. Luminaire will be considered defective if it does not pass tests and inspections.

### **3.4 DEMONSTRATION**

- A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaire and photocell.

END OF SECTION

## **APPENDIX A**



Report of Subsurface Exploration  
and Geotechnical Engineering Evaluation  
**VDOT New London Area HQ Improvements**  
New London, Virginia  
F&R Project No. 62T0505

Prepared For:  
**Hughes Associates Architects Inc.**  
656 Elm Avenue, SW  
Roanoke, Virginia 24016

Prepared By:  
**Froehling & Robertson, Inc.**  
1734 Seibel Drive, N.E.  
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December 2015



**FROEHLING & ROBERTSON, INC.**

*Engineering Stability Since 1881*

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**F&R Project No.: 62T0505**

23 December 2015

Hughes Associates Architects, Inc.  
656 Elm Avenue, SW  
Roanoke, Virginia 24016

Attention: Mr. Don Witt

Subject: VDOT New London Area HQ Improvements  
New London, Virginia

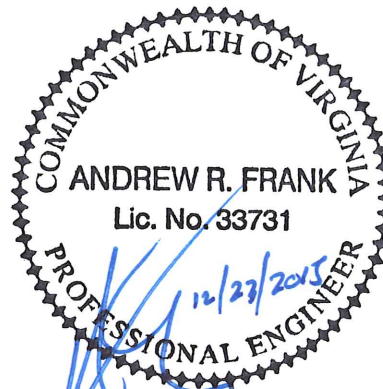
Dear Mr. Witt:

The purpose of this report is to present the results of the subsurface exploration program and geotechnical engineering evaluation undertaken by Froehling & Robertson, Inc. (F&R) in connection with the VDOT New London Area Headquarters Improvements project. Our services were performed in general accordance with our Proposal No. 1662-00385 as authorized by Mr. Don Witt of Hughes Associates Architects, Inc. The attached report presents our understanding of the project, reviews our exploration procedures, describes existing site and general subsurface conditions, and presents our evaluations, conclusions, and recommendations.

We have enjoyed working with you on this project, and we are prepared to assist you with the recommended quality assurance monitoring and testing services during construction. Please contact us if you have any questions regarding this report or if we may be of further service.

Sincerely,  
**FROEHLING & ROBERTSON, INC.**

Erin K. Phillips, E.I.T.  
Staff Engineer



Andrew R. Frank, P.E.  
Senior Geotechnical Engineer

Distribution: Addressee (1 original, 1 copy via e-mail: [dwitt@hughesae.com](mailto:dwitt@hughesae.com))

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**APPENDICES**

**APPENDIX A**

    GBA Important Information about Your Geotechnical Engineering Report  
    Site Vicinity Map (Drawing No. 1)

**APPENDIX B**

    Classification of Soils for Engineering Purposes  
    Key to Boring Log Soil Classification  
    Boring Location Plan (Drawing No. 2)  
    Composite Subsurface Profile (Drawing No. 3)  
    Boring Logs (2)





## EXECUTIVE SUMMARY

This Executive Summary is provided as a brief overview of our geotechnical engineering evaluation for the project and is not intended to replace more detailed information contained elsewhere in this report. As an overview, this summary inherently omits details that could be very important to the proper application of the provided geotechnical design recommendations. This report should be read in its entirety prior to implementation into design and construction. The Project Information section of this report should be particularly reviewed by project designers to confirm that the geotechnical engineer's understanding of the project concurs with the current project parameters at the time of project design.

- The site was explored on 10 December 2015 by two standard penetration test borings (designated as B-1 and B-2). Site subsurface conditions generally consisted of surficial soil underlain by residual soils.
- The proposed structure may be supported on a shallow foundation system bearing on approved undisturbed residual soil or controlled structural fill placed in accordance with our recommendations. We recommend that foundations be designed for a maximum allowable bearing pressure of 2,500 pounds per square foot (psf) for footings bearing on approved subgrades. To reduce the possibility of localized shear failures, spread and strip footings should be a minimum of 3 feet and 2 feet wide, respectively.
- Based on the conditions encountered during our subsurface exploration and our general experience in the project vicinity, foundation supporting soils could have a moderate to high shrink-swell potential. Accordingly, we recommend that exterior footings be constructed at least 3 feet below adjacent exterior finished grades.
- Based on the boring data and assumed load and grading information, we estimate total settlements of less than 1 inch, with differential settlement of  $\frac{1}{2}$  to  $\frac{2}{3}$  the estimated total settlement. The magnitude of differential settlements will be influenced by the variation in excavation requirements across the building footprint, the distribution of loads, and the variability of underlying soils.
- Based on the boring data and in general accordance with the IBC, a Site Class "D" may be used to develop the project's Seismic Design Category for further evaluations relative to Earthquake Load design.



## 1.0 INTRODUCTION

### 1.1 Project Information

Our understanding of the project is based on information provided by Mr. Don Witt of Hughes Associates Architects Inc. and as well as our experience with similar projects. We understand that a new building is proposed for construction at the VDOT New London Area Headquarters (HQ) facility at 5507 Thomas Jefferson Road in New London, Virginia (see Site Vicinity Map, Drawing No. 1). The new structure will be constructed next to an existing staff parking area to the west of Thomas Jefferson Road. The building will reportedly be an approximate 40 feet by 40 feet single story structure.

Definitive structural loading information has not been provided at this time. However, based on our previous experience with similar projects, we have assumed maximum column and continuous wall loads of approximately 50 kips and 3 kips per linear foot (klf), respectively. No topographic information has been provided at this time; however, the site appears to be relatively open and level. Therefore, we have assumed that cuts and fills on the order of 2 feet or less will be required to develop the site.

### 1.2 Scope of Services

The purposes of our involvement on this project were to 1) provide general descriptions of the subsurface soil conditions at the locations explored, 2) provide foundation design recommendations, and 3) comment on geotechnical aspects of the proposed development including general recommendations regarding site preparation and earthwork. In order to accomplish the above objectives, we undertook the following scope of services:

- 1) Visited the site to observe existing surface conditions and features, and to mark boring locations.
- 2) Coordinated utility clearance with Miss Utility services and available VDOT personnel.
- 3) Reviewed and summarized readily available geologic information relative to the project site.
- 4) Executed the requested subsurface exploration consisting of two soil test borings drilled to depths of approximately 20 feet.
- 5) Performed one soil classification test to aid in soil classifications and to initially evaluate the soils with respect to shrink swell potential.
- 6) Provided a Seismic Site Class Definition per the 2012 International Building Code (IBC) based on interpretation of the standard penetration test data.
- 7) Evaluated the findings of the test borings and laboratory test results relative to shallow foundation support and provided appropriate design criteria.



- 8) Prepared this written report summarizing our work on the project, providing descriptions of the subsurface conditions encountered, providing foundation design criteria, and discussing geotechnical related aspects of the proposed construction. Copies of the test boring logs and laboratory test results are included.

Our scope of services did not include rock coring, survey services, quantity estimates, pavement recommendations, preparation of plans or specifications, formal slope stability analyses, detention pond considerations, evaluations of earthquake motions, or the identification and evaluation of wetland or other environmental aspects of the project site.



## 2.0 SUBSURFACE EXPLORATION PROCEDURES

The subsurface exploration program, performed on 10 December 2015, consisted of two test borings (designated as B-1 and B-2) performed at the approximate locations shown on the attached Boring Location Plan (Drawing No. 2, Appendix B). F&R personnel marked the boring locations by estimating distances from existing features. The attached Boring Location Plan consists of an overlay of these approximate boring locations on an available aerial photograph (photograph source: Google maps). In consideration of the methods used in their determination as well as the base map's accuracy, the boring locations shown on the attached Boring Location Plan should be considered approximate.

The test borings were performed in accordance with generally accepted practice using a truck mounted CME-55 rotary drill rig equipped with an automatic hammer. Hollow-stem augers were advanced to pre-selected depths, the center plug was removed, and representative soil samples were recovered with a standard split-spoon sampler (1 3/8 in. ID, 2 in. OD) in general accordance with ASTM D 1586, the Standard Penetration Test (SPT). Utilizing an automatic hammer, a weight of 140 pounds is freely dropped from a height of 30 inches to drive the split-spoon sampler into the soil. The number of blows required to drive the split-spoon sampler three consecutive 6 inch increments is recorded, and the blows of the last two increments are summed to obtain the Standard Penetration Resistance (N-value). The N-value provides a general indication of in-situ soil conditions and has been correlated with certain engineering properties of soils.

An automatic hammer was used to perform the Standard Penetration Test (SPT) on this project. Research has shown that the Standard Penetration Resistance (N-value) determined by an automatic hammer is different than the N-value determined by the safety hammer method. Most correlations that are published in the technical literature are based on the N-value determined by the safety hammer method. This is commonly termed  $N_{60}$  as the rope and cathead with a safety hammer delivers about 60 percent of the theoretical energy delivered by a 140-pound hammer falling 30 inches. Several researchers have proposed correction factors for the use of hammers other than the safety hammer to correct the values to be equivalent to the safety hammer SPT  $N_{60}$ -values. The correction is made using the following equation:

$$N_{60} = N_{\text{field}} \times C_E$$

$N_{\text{field}}$  in the equation above is the SPT N-value as recorded with the equipment utilized in the field, and for our use of this equation,  $C_E$  a relative hammer efficiency ratio, i.e. our automatic hammer efficiency (specifically 86% for the truck-mounted drill rig used on this project) divided by the theoretical  $N_{60}$  efficiency (60%). Accordingly, we recommend a correction factor ( $C_E$ ) of approximately 1.43 for conversion of the recorded  $N_{\text{field}}$  values to normalized  $N_{60}$  values for the automatic hammer used on this project. We note that the N-values reported on the Boring Logs included in this report are the actual, uncorrected, field derived N-values ( $N_{\text{field}}$ ).

Subsurface water level readings were taken in each of the borings immediately upon completion of the soil drilling process. Upon completion of drilling, the boreholes were backfilled with auger cuttings (soil). Periodic observation and maintenance of the boreholes should be performed due to potential subsidence at the ground surface, as the borehole backfill could settle over time.



Representative portions of the split-spoon soil samples obtained throughout the exploration program were placed in glass jars and transported to our laboratory. In the laboratory, the soil samples were classified by a member of our professional staff in general accordance with techniques outlined in the visual-manual identification procedure (ASTM D 2488) and the Unified Soil Classification System. The soil descriptions and classifications discussed in this report and shown on the attached boring logs are generally based on visual observation and should be considered approximate.

Copies of the boring logs are provided and classification procedures are further explained in the attached Appendix B. Split-spoon soil samples recovered on this project will be stored at F&R's office for a period of sixty days. After sixty days, the samples will be discarded unless prior notification is provided to us in writing.



### 3.0 SITE AND SUBSURFACE CONDITIONS

#### 3.1 Site Description

The proposed project site is located at the VDOT New London Headquarters (HQ) at 5507 Thomas Jefferson Road in New London, Bedford County, Virginia. In general, the VDOT New London Area HQ is located to the west of Thomas Jefferson Road. The ground cover across the proposed building site consists of gravel, short maintained grass, and some existing vegetated/wooded areas. It appears that the new building site will be located west of an existing staff parking area off of Thomas Jefferson Road. Based on Miss Utility response, buried water and communication lines are present onsite. Additional undisclosed buried utilities may also be present on site.

#### 3.2 Regional Geology

The site lies within the Blue Ridge physiographic province of Virginia. Available geologic references (Geologic Map of Roanoke 30X60 Minute Quadrangle, 1997) report that the site is underlain by the Alligator Back Formation. This formation is characterized by Proterozoic aged rocks, typically laminated mica gneiss, mica schist, quartzite, calc-gneiss, graphitic phyllite, and marble. The soils resulting from in-situ weathering, without significant transportation, are called residual soils.

The residual soil profile generally grades downward gradually from fine-grained plastic soils near the ground surface to coarse-grained soils at greater depth. A transitional zone called "Partially Weathered Rock" is normally found above the parent bedrock. Weathering of the parent bedrock is generally more rapid near fracture zones and therefore, the bedrock surface may be irregular. Irregular patterns of differential weathering may also result in zones of rock and partially weathered rock embedded within the more completely weathered coarse-grained soils.

#### 3.3 Subsurface Conditions

##### 3.3.1 General

The subsurface conditions discussed in the following paragraphs and those shown on the boring logs represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. The transitions between different soil strata are usually less distinct than those shown on the boring logs. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times. Data from the specific test borings are shown on the attached boring logs in Appendix B. In addition a Composite Subsurface Profile (Drawing No. 3) is attached to conceptually illustrate subsurface conditions encountered across the site.

Below the existing ground surface, the borings generally encountered surficial soil underlain by residual soils. These materials are generally discussed in the following paragraphs.



**3.3.2 Surficial Soils**

Surficial soils were encountered in each of the test borings to depths ranging from approximately 2 to 2.5 inches. Surficial soils are typically a dark-colored soil material containing roots, fibrous matter, and/or other organic components, and are generally unsuitable for engineering purposes. We note that no laboratory testing has been performed to determine the organic content or horticultural properties of the observed surficial soil materials. Therefore, the term “surficial soils” is not intended to indicate suitability for landscaping and/or other purposes. The surficial soil depths provided in this report are based on driller observations and should be considered approximate. Actual surficial soil depths should be expected to vary across the site.

**3.3.3 Residual Soils**

Residual soils, formed by the in-place weathering of the parent rock, were encountered below the surficial materials in each of the borings. Sampled residual soils were generally described as silt (MH) and silty sand (SM). Standard penetration resistances within the sampled residuum ranged from 7 to 23 blows per foot (bpf).

**3.3.4 Subsurface Water**

Subsurface water for the purposes of this report is defined as water encountered below the existing ground surface. Measurable subsurface water was not encountered in any of the borings immediately upon completion of drilling. Fluctuations in subsurface water levels and soil moisture can be anticipated with changes in precipitation, run-off, and season.

**3.4 Laboratory Testing Program**

A split-spoon sample, obtained from boring B-2, was tested in general accordance with applicable American Society for Testing and Materials (ASTM) test methods for natural moisture content (ASTM D 2216), percent passing #200 sieve (ASTM D 1140), and Atterberg limits (ASTM D 4318). The results of the laboratory tests are summarized in the following table.

**Soil Classification Test Summary**

Boring No.	Sample Depth (ft)	Natural Moisture Content (%)	% Finer than No. 200 Sieve	Atterberg Limits			USCS Classification
				L.L.	P.L.	P.I.	
B-2	1 – 2.5	29.2	81	68	37	31	elastic silt (MH) with sand



## 4.0 DESIGN RECOMMENDATIONS

### 4.1 General

The following evaluations and recommendations are based on our observations at the site, interpretation of the field and laboratory data obtained during this exploration, and our experience with similar subsurface conditions and projects. Soil penetration data has been used to estimate an allowable bearing pressure and associated settlement using established correlations. Subsurface conditions in unexplored locations may vary from those encountered. If structure locations, loadings, or elevations are changed, we should be notified and requested to confirm and, if necessary, re-evaluate our recommendations.

Determination of an appropriate foundation system for a given structure is dependent on the proposed structural loads, soil conditions, and construction constraints such as proximity to other structures, etc. The subsurface exploration aids the geotechnical engineer in determining the soil stratum appropriate for structural support. This determination includes considerations with regard to both allowable bearing capacity and compressibility of the soil strata. In addition, since the method of construction greatly affects the soils intended for structural support, consideration must be given to the implementation of suitable methods of site preparation, fill compaction, and other aspects of construction.

### 4.2 Foundation Design

The new building may be supported on a shallow foundation system bearing on approved undisturbed residual soil or controlled structural fill placed in accordance with our recommendations. We recommend that foundations be designed for a maximum allowable bearing pressure of 2,500 pounds per square foot (psf) for footings bearing on approved subgrades. To reduce the possibility of localized shear failures, spread and strip footings should be a minimum of 3 feet and 2 feet wide, respectively.

### 4.3 Shrink-Swell and Frost Depth Considerations

Based on the conditions encountered during our subsurface exploration, our laboratory testing results, and our general experience in the project vicinity, we anticipate that the on-site soils could have a moderate to high shrink-swell potential. Accordingly, we recommend that exterior footings on soils subgrades be constructed at least 3 feet below adjacent grades in order to reduce the effect of potential surface water migration to the plastic soils that may be encountered near the foundation bearing level and to bear below the normal frost depth of 2 feet.

### 4.4 Estimated Foundation Settlements

Based on the boring data and assumed loading and grading information, we estimate total settlements of less than 1 inch, with differential settlement of  $\frac{1}{2}$  to  $\frac{2}{3}$  the estimated total settlement. The magnitude of differential settlements will be influenced by the variation in excavation requirements across the building footprint, the distribution of loads, and the variability of underlying soils.





Our settlement analysis was performed on the basis of provided structural loading information and the grading assumptions discussed in the project information section of this report. Actual settlements experienced by the structure and the time required for these soils to settle will be influenced by undetected variations in subsurface conditions, actual structural loads, final grading plans, and the quality of fill placement and foundation construction.

#### **4.5 Ground Floor Slabs**

Ground floor slabs may be designed as a slab-on-grade supported by approved undisturbed residual soil. Slab-on-grade support is contingent upon successful completion of the subgrade evaluation process as described in the Site Preparation section (Section 5.1) of this report.

A vapor retarder should be used beneath ground floor slabs that will be covered by tile, wood, carpet, impermeable floor coatings, and/or if other moisture-sensitive equipment or materials will be in contact with the floor. However, the use of vapor retarders may result in excessive curling of floor slabs during curing. We refer the floor slab designer to ACI 302.1R-96, Sections 4.1.5 and 11.11, for further discussion on vapor retarders, curling, and the means to reduce concrete shrinkage and curling.

Proper jointing of the ground floor slab is also essential to minimize cracking. ACI suggests that unreinforced, plain concrete slabs may be jointed at spacings of 24 to 36 times the slab thickness, up to a maximum spacing of 18 feet. Floor slab construction should incorporate isolation joints along bearing walls and around column locations to allow minor movements to occur without damage. Utility or other construction excavations in the prepared floor subgrade should be backfilled to a controlled fill criterion to provide uniform floor support.

#### **4.6 Seismic Site Classification**

The following recommendations are based on Section 1613.3.2 of the 2012 International Building Code (IBC). Our scope of services did not include a seismic conditions survey to determine site-specific shear wave velocity information. IBC references a methodology for interpretation of Standard Penetration Test resistance values (N-values) to determine a Site Class Definition. However, this method requires averaging N-values over the top 100 feet of the subsurface profile. We note that the test borings for this project were extended to a maximum depth of 20 feet below existing site grades.

The available subsurface data from our exploration indicates an N-value range of about 7 to 23 bpf within the upper 20 feet below existing site grades. Based on the boring data and in general accordance with 1613.3.2 of the IBC, a Site Class Definition "D" should be used to develop the project's Seismic Design Category for further evaluations relative to Earthquake Load design.

We note that the above provided Site Classification is based on information available at the time this report was written. Should this classification be so onerous to the project cost that further study is warranted, we can perform a site-specific geo-physical survey to attain sufficient detail to refine the project's Seismic Site Classification. This additional testing would be beyond the currently authorized scope of services for this project.



## **5.0 CONSTRUCTION RECOMMENDATIONS**

### **5.1 Site Preparation**

Before proceeding with construction, surficial soils, gravel, and any other deleterious non-soil materials should be stripped or removed from the proposed construction area. During the clearing and stripping operations, positive surface drainage should be maintained to prevent the accumulation of water. Underground utilities should be re-routed to locations a minimum of 10 feet outside of proposed new structure footprints.

After stripping, areas intended to support new fill, floor slabs and foundations should be carefully evaluated by a geotechnical engineer. At that time, the engineer may require proofrolling of the subgrade with a 20- to 30-ton loaded truck or other pneumatic-tired vehicle of similar size and weight. Proofrolling should be performed during a time of good weather and not while the site is wet, frozen, or severely desiccated. The purpose of the proofrolling is to locate soft, weak, or excessively wet soils present at the time of construction and provides an opportunity for the geotechnical engineer to locate inconsistencies intermediate of our boring locations.

In addition, particular attention should be given to any encountered buried utility trenches within the development footprint. For obvious reasons, utility trenches are avoided during our drilling program. Our experience is that utility trenches are sometimes backfilled with very little compactive effort. Where utility lines are removed, the trench subgrade should be verified by an F&R representative prior to backfilling in accordance with the controlled structural fill recommendations provided in this report. If in-place abandonment is preferred, open conduits, pipes, or culverts should be grouted full and the overlying in-place backfill evaluated prior to at-grade and/or new fill construction.

The actual extent of undercutting and/or in-place stabilization required can best be determined by a representative of the geotechnical engineer at the time of construction. Once the site has been properly prepared, at-grade construction may proceed.

### **5.2 Foundation Construction**

All foundation subgrades should be observed, evaluated, and verified for the design bearing pressure by a geotechnical engineer after excavation and prior to reinforcement steel placement. If low consistency soils are encountered during foundation construction, localized undercutting and/or in-place stabilization of foundation subgrades may be required. The actual need for, and extent of, undercutting should be based on field observations made by the geotechnical engineer at the time of construction.

Excavations for footings should be made in such a way as to provide bearing surfaces that are firm and free of loose, soft, wet, or otherwise disturbed soils. Foundation concrete should not be placed on frozen or saturated subgrades. If such materials are allowed to remain below foundations, settlements will increase. Foundation excavations should be concreted as soon as practical after they are excavated. If an excavation is left open for an extended period, a thin mat of lean concrete should be placed over the bottom to minimize damage to the bearing surface from weather or construction activities. Water should not be allowed to pond in any excavation.



### 5.3 Controlled Structural Fill

Based on the boring data, controlled structural fill may be constructed using the non-organic on-site soils. If encountered, we do not recommend the use of highly-plastic clay or silt (CH or MH) for below grade wall backfill. If an off-site borrow source is required to balance the site, the imported materials should have a classification of CL, ML, SC, or SM as defined by the Unified Soil Classification System. Other materials may be suitable for use as controlled structural fill material and should be individually evaluated by the geotechnical engineer. Controlled structural fill should be free of boulders, organic matter, debris, or other deleterious materials and should have a maximum particle size no greater than 3 inches. In addition, we recommend a minimum standard Proctor (ASTM D 698) maximum dry density of approximately 90 pounds per cubic feet for fill materials.

Fill materials should be placed in horizontal lifts with maximum height of 8 inches loose measure. New fill should be adequately keyed into stripped and scarified subgrade soils and should, where applicable, be benched into the existing slopes. During fill operations, positive surface drainage should be maintained to prevent the accumulation of water. We recommend that structural fill be compacted to at least 95 percent of the standard Proctor maximum dry density. In confined areas such as utility trenches, portable compaction equipment and thin lifts of 3 to 4 inches may be required to achieve specified degrees of compaction.

In general, we recommend that the moisture content of fill soils be maintained within three percentage points of the optimum moisture content as determined from the standard Proctor density test. We recommend that the contractor have equipment on site during earthwork for both drying and wetting of fill soils. Moisture control may be especially difficult during winter months or extended periods of rain. Attempts to work the soils when wet can be expected to result in deterioration of otherwise suitable soil conditions or of previously placed and properly compacted fill. Where construction traffic or weather has disturbed the subgrade, the upper 8 inches of soils (or more if warranted) intended for structural support should be scarified and re-compacted. Each lift of fill should be tested in order to confirm that the recommended degree of compaction is attained.

### 5.4 Subsurface Water Conditions

Subsurface water for the purposes of this report is defined as water encountered below the existing ground surface. Based on the subsurface water data obtained during our exploration program, we generally anticipate that subsurface water will not be encountered during anticipated earthwork or shallow foundation excavations at the site. However, the contractor should be prepared to dewater should water levels vary from those encountered during the drilling program. Fluctuations in subsurface water levels and soil moisture can be anticipated with changes in precipitation, runoff, and season.



## 6.0 CONTINUATION OF SERVICES

We recommend that we be given the opportunity to review the foundation plan, grading plan, and project specifications when construction documents approach completion. This review evaluates whether the recommendations and comments provided herein have been understood and properly implemented. We also recommend that Froehling & Robertson, Inc. be retained for professional and construction materials testing services during construction of the project. Our continued involvement on the project helps provide continuity for proper implementation of the recommendations discussed herein. These services are not part of the currently authorized scope of work.



## 7.0 LIMITATIONS

This report has been prepared for the exclusive use of Hughes Associates Architects Inc. or their agent, for specific application to the VDOT New London Area HQ Improvements project in New London, Virginia, in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. Our conclusions and recommendations are based on design information furnished to us, the data obtained from the previously described subsurface exploration program, and generally accepted geotechnical engineering practice. The conclusions and recommendations do not reflect variations in subsurface conditions which could exist intermediate of the boring locations or in unexplored areas of the site. Should such variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon on-site observations of the conditions.

Regardless of the thoroughness of a subsurface exploration, there is the possibility that conditions between borings will differ from those at the boring locations, that conditions are not as anticipated by the designers, or that the construction process has altered the soil conditions. Therefore, experienced geotechnical engineers should evaluate earthwork, pavement, and foundation construction to verify that the conditions anticipated in design actually exist. Otherwise, we assume no responsibility for construction compliance with the design concepts, specifications, or recommendations.

In the event that changes are made in the design or location of the proposed structure, the recommendations presented in the report shall not be considered valid unless the changes are reviewed by our firm and conclusions of this report modified and/or verified in writing. If this report is copied or transmitted to a third party, it must be copied or transmitted in its entirety, including text, attachments, and enclosures. Interpretations based on only a part of this report may not be valid. This report contains 12 pages of text and the attached.

## **APPENDIX A**

# Important Information about Your Geotechnical-Engineering Report

*Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.*

*While you cannot eliminate all such risks, you can manage them. The following information is provided to help.*

## **Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects**

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

## **Read the Full Report**

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## **A Geotechnical-Engineering Report Is Based on a Unique Set of Project-Specific Factors**

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## **Subsurface Conditions Can Change**

A geotechnical-engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical-engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

## **Most Geotechnical Findings Are Professional Opinions**

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## **A Report's Recommendations Are *Not* Final**

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

### **A Geotechnical Engineering Report Is Subject to Misinterpretation**

Other design team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical-engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

### **Do Not Redraw the Engineer's Logs**

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

### **Give Contractors a Complete Report and Guidance**

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

### **Read Responsibility Provisions Closely**

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

### **Geoenvironmental Concerns Are Not Covered**

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

### **Obtain Professional Assistance To Deal with Mold**

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold-prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

### **Rely on Your GBA-Member Geotechnical Engineer for Additional Assistance**

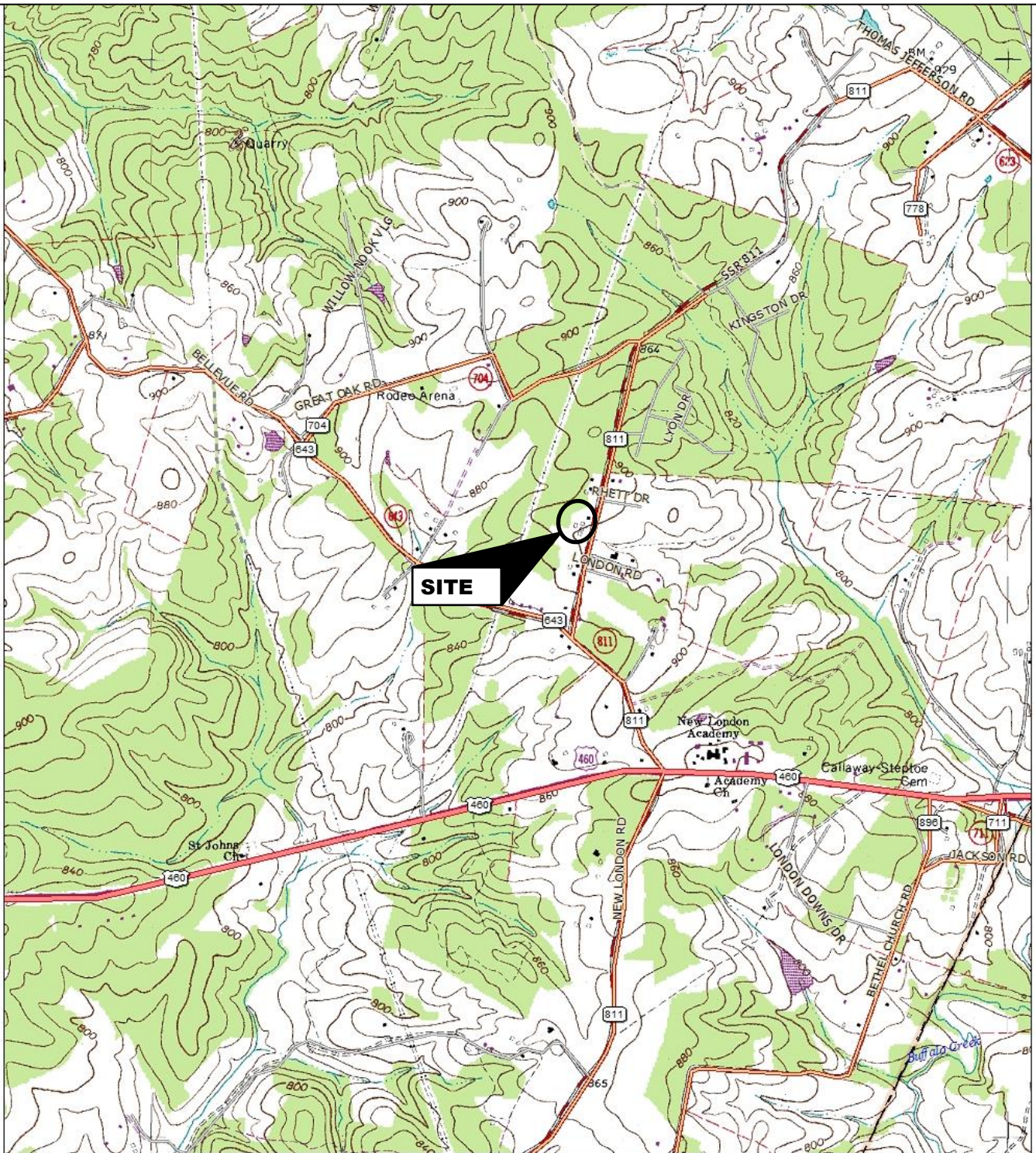
Membership in the GEOPROFESSIONAL BUSINESS ASSOCIATION exposes geotechnical engineers to a wide array of risk confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBA-member geotechnical engineer for more information.



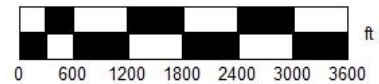
8811 Colesville Road/Suite G106, Silver Spring, MD 20910  
Telephone: 301/565-2733 Facsimile: 301/589-2017  
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Adapted from the USGS 7.5 minute series topographic quadrangle:  
Forest, VA (1985)



**FROEHLING & ROBERTSON, INC.**

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**DATE:** December 2015

**SCALE:** As Shown

**DRAWN:** BWS

62T0505

Hughes Associates Architects  
VDOT New London Area HQ Improvements  
New London, Virginia

SITE  
VICINITY  
MAP

**DRAWING NO.**

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## **APPENDIX B**



**CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES**  
 ASTM Designation: D 2487  
 (Based on the Unified Soil Classification System)

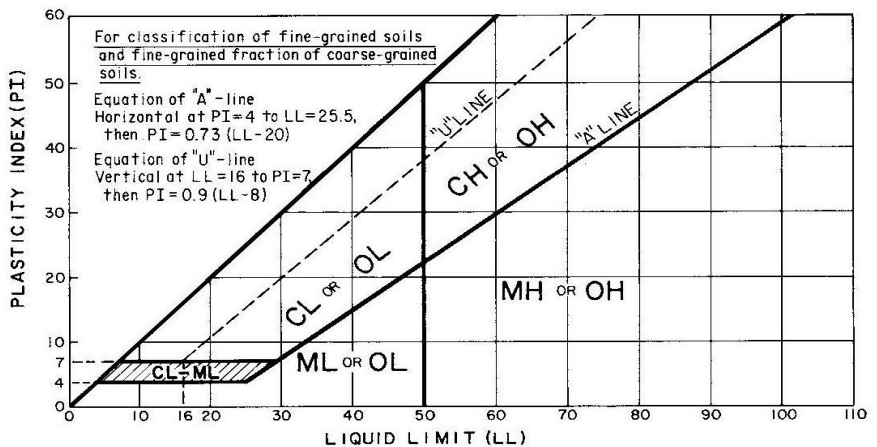
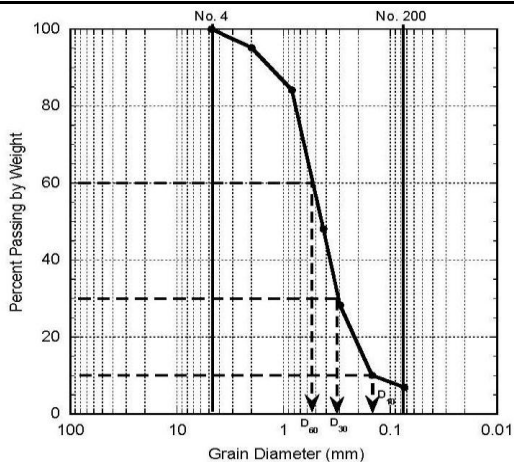
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Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>A</sup>				Soil Classification		
				Group Symbol	Group Name <sup>B</sup>	
COARSE-GRAINED SOILS  More than 50% retained on the No. 200 sieve	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean gravels (Less than 5% fines <sup>C</sup> )	$Cu \geq 4$ and $1 \leq Cc \leq 3^D$	GW	Well-graded gravel <sup>E</sup>	
			$Cu < 4$ and/or $[Cc < 1$ or $Cc > 3]^D$	GP	Poorly graded gravel <sup>E</sup>	
		Gravels with fines (More than 12% fines <sup>C</sup> )	Fines classify as ML or MH	GM	Silty gravel <sup>E,F,G</sup>	
			Fines classify as CL or CH	GC	Clayey gravel <sup>E,F,G</sup>	
	Sands (50% or more of coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines <sup>H</sup> )	$Cu \geq 6$ and $1 \leq Cc \leq 3^D$	SW	Well-graded sand <sup>I</sup>	
			$Cu < 6$ and/or $[Cc < 1$ or $Cc > 3]^D$	SP	Poorly graded sand <sup>I</sup>	
Sands with fines (More than 12% fines <sup>H</sup> )	Sands with fines (More than 12% fines <sup>H</sup> )	Fines classify as ML or MH	SM	Silty sand <sup>F,G,I</sup>		
		Fines classify as CL or CH	SC	Clayey sand <sup>F,G,I</sup>		
FINE-GRAINED SOILS  50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	$PI > 7$ and plots on or above "A" line <sup>J</sup>	CL	Lean clay <sup>K,L,M</sup>	
			$PI < 4$ or plots below "A" line <sup>J</sup>	ML	Silt <sup>K,L,M</sup>	
		Organic	$\frac{\text{Liquid limit} - \text{oven dried}}{\text{Liquid limit} - \text{not dried}} < 0.75$		OL	Organic clay <sup>K,L,M,N</sup> Organic silt <sup>K,L,M,O</sup>
	Silts and Clays Liquid limit 50 or more	Inorganic	$PI$ plots on or above "A" line	CH	Fat clay <sup>K,L,M</sup>	
			$PI$ plots below "A" line	MH	Elastic silt <sup>K,L,M</sup>	
		Organic	$\frac{\text{Liquid limit} - \text{oven dried}}{\text{Liquid limit} - \text{not dried}} < 0.75$		OH	Organic clay <sup>K,L,M,P</sup> Organic silt <sup>K,L,M,Q</sup>
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic in odor			PT	Peat	

- <sup>A</sup> Based on the material passing the 3-in. (75-mm) sieve.
- <sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
- <sup>C</sup> Gravels with 5 to 12 % fines require dual symbols:  
 GW-GM well-graded gravel with silt  
 GW-GC well-graded gravel with clay  
 GP-GM poorly graded gravel with silt  
 GP-GC poorly graded gravel with clay
- <sup>D</sup>  $Cu = \frac{D_{60}}{D_{10}}$      $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
- <sup>E</sup> If soil contains  $\geq 15\%$  sand, add "with sand" to group name.
- <sup>F</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

- <sup>G</sup> If fines are organic, add "with organic fines" to group name.
- <sup>H</sup> Sands with 5 to 12 % fines require dual symbols:  
 SW-SM well-graded sand with silt  
 SW-SC well-graded sand with clay  
 SP-SM poorly graded sand with silt  
 SP-SC poorly graded sand with clay
- <sup>I</sup> If soil contains  $\geq 15\%$  gravel, add "with gravel" to group name.
- <sup>J</sup> If Atterburg limits plot in hatched area, soil is a CL-ML, silty clay.

- <sup>K</sup> If soil contains 15 to  $< 30\%$  plus No. 200, add "with sand" or "with gravel", whichever is predominant.
- <sup>L</sup> If soil contains  $\geq 30\%$  plus No. 200, predominantly sand, add "sandy" to group name.
- <sup>M</sup> If soil contains  $\geq 30\%$  plus No. 200, predominantly gravel add "gravelly" to group name.
- <sup>N</sup>  $PI \geq 4$  and plots on or above "A" line.
- <sup>O</sup>  $PI < 4$  or plots below "A" line.
- <sup>P</sup>  $PI$  plots on or above "A" line.
- <sup>Q</sup>  $PI$  plots below "A" line.





## KEY TO BORING LOG SOIL CLASSIFICATION

### Particle Size and Proportion

Visual descriptions are assigned to each soil sample or stratum based on estimates of the particle size of each component of the soil and the percentage of each component of the soil.

Particle Size		Proportion		
Descriptive Terms		Descriptive Terms		
Soil Component	Particle Size	Component	Term	Percentage
Boulder	> 12 inch	Major	Uppercase Letters (e.g., SAND, CLAY)	> 50%
Cobble	3 - 12 inch	Secondary	Adjective (e.g., sandy, clayey)	20% - 50%
Gravel-Coarse	3/4 - 3 inch			
-Fine	#4 - 3/4 inch	Minor	Some	15% - 25%
Sand-Coarse	#10 - #4			
-Medium	#40 - #10			
-Fine	#200 - #40	Little	Trace	5% - 15%
Silt (non-cohesive)	< #200			
Clay (cohesive)	< #200			0% - 5%

Notes:

- Particle size is designated by U.S. Standard Sieve Sizes
- Because of the small size of the split-spoon sampler relative to the size of gravel, the true percentage of gravel may not be accurately estimated.

### Density or Consistency




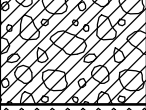
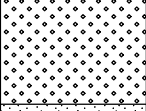
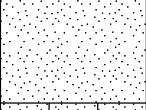
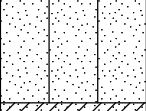
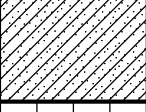
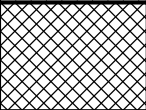
The standard penetration resistance values (N-values) are used to describe the density of coarse-grained soils (GRAVEL, SAND) or the consistency of fine-grained soils (SILT, CLAY). Sandy silts of very low plasticity may be assigned a density instead of a consistency.

DENSITY		CONSISTENCY	
Term	N-Value	Term	N-Value
Very Loose	0 - 4	Very Soft	0 - 1
Loose	5 - 10	Soft	2 - 4
Medium Dense	11 - 30	Firm	5 - 8
Dense	31 - 50	Stiff	9 - 15
Very Dense	> 50	Very Stiff	16 - 30
		Hard	> 30

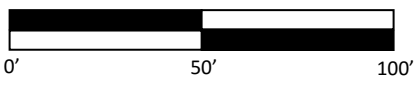
Notes:

- The N-value is the number of blows of a 140 lb. Hammer freely falling 30 inches required to drive a standard split-spoon sampler (2.0 in. O.D., 1-3/8 in. I.D.) 12 inches into the soil after properly seating the sampler 6 inches.
- When encountered, gravel may increase the N-value of the standard penetration test and may not accurately represent the in-situ density or consistency of the soil sampled.

# SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS		
			GRAPH	LETTER			
<p><b>COARSE GRAINED SOILS</b></p> <p>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE</p>	<p><b>GRAVEL AND GRAVELLY SOILS</b></p> <p>(LITTLE OR NO FINES)</p>	CLEAN GRAVELS		<b>GW</b>	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
		GRAVELS WITH FINES		<b>GP</b>	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
		<p>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE</p>	GRAVELS WITH FINES		<b>GM</b>	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES	
			(APPRECIABLE AMOUNT OF FINES)		<b>GC</b>	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES	
	<p><b>SAND AND SANDY SOILS</b></p> <p>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE</p>	<p>CLEAN SANDS</p> <p>(LITTLE OR NO FINES)</p>	CLEAN SANDS		<b>SW</b>	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
			(LITTLE OR NO FINES)		<b>SP</b>	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES	
		<p>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE</p>	<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>	SANDS WITH FINES		<b>SM</b>	SILTY SANDS, SAND - SILT MIXTURES
				(APPRECIABLE AMOUNT OF FINES)		<b>SC</b>	CLAYEY SANDS, SAND - CLAY MIXTURES
			<p><b>FINE GRAINED SOILS</b></p> <p>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE</p>	<p><b>SILTS AND CLAYS</b></p> <p>LIQUID LIMIT LESS THAN 50</p>	(Symbol for ML: Vertical lines)	<b>ML</b>	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
					(Symbol for CL: Diagonal hatching)	<b>CL</b>	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
(Symbol for OL: Horizontal wavy lines)	<b>OL</b>	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY					
<p><b>SILTS AND CLAYS</b></p> <p>LIQUID LIMIT GREATER THAN 50</p>	(Symbol for MH: Vertical lines)	<b>MH</b>		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS			
	(Symbol for CH: Diagonal hatching)	<b>CH</b>		INORGANIC CLAYS OF HIGH PLASTICITY			
	(Symbol for OH: Wavy lines)	<b>OH</b>		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS			
EXISTING FILL				<b>FILL</b>	EXISTING FILL MATERIALS		

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS



Adapted from *Google Maps* image. No claim is made as to the accuracy of the indicated boring locations other than for conceptual purposes to illustrate the exploration locations relative to existing site features. In consideration of the methods used in their determination, as well as the base map's accuracy, the test boring locations shown should be considered approximate



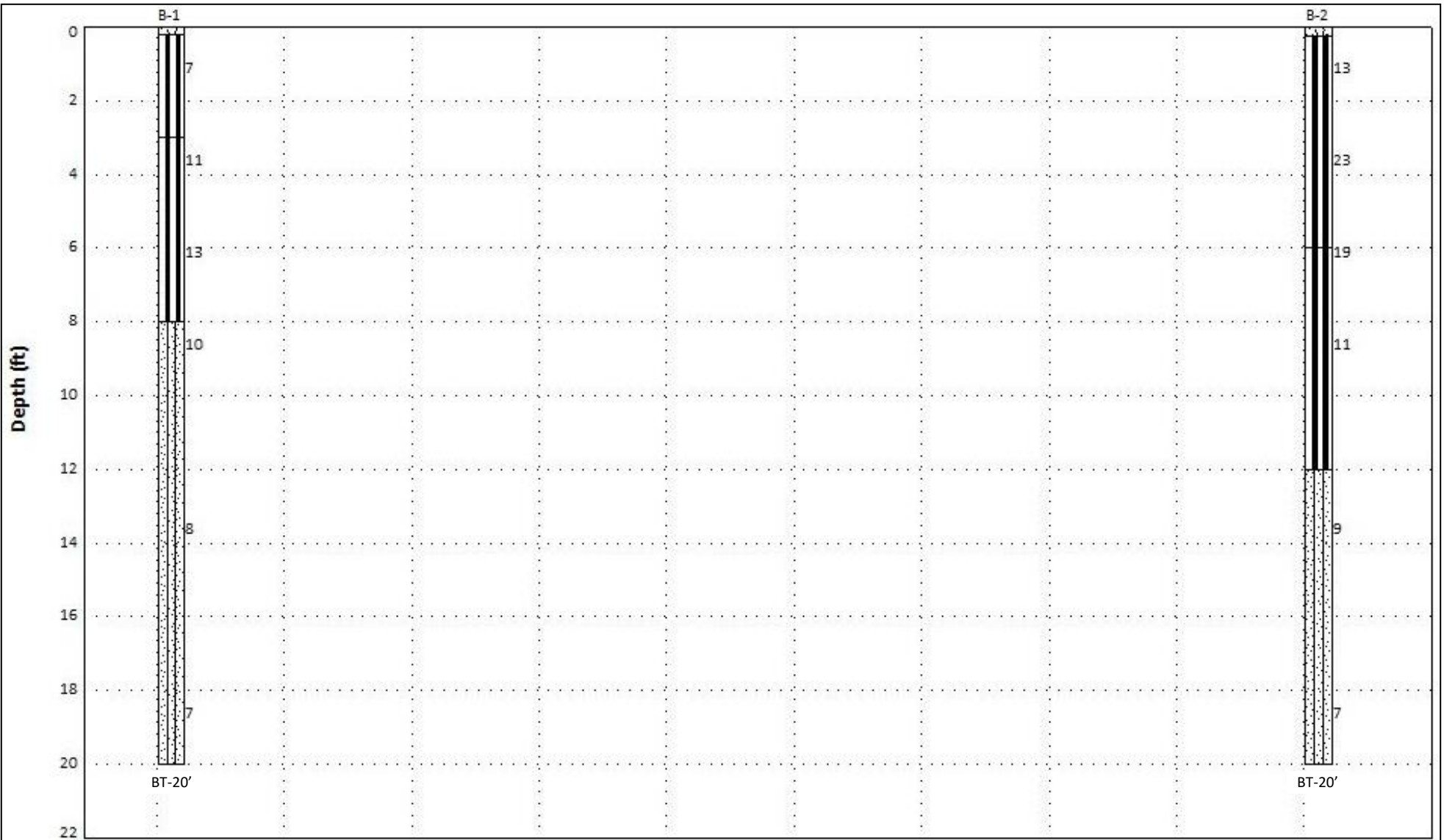
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<b>DATE:</b>	December 2015
<b>SCALE:</b>	As shown (approximate)
<b>DRAWN:</b>	EKP      62T0505

Hughes Associates Architects  
 VDOT New London Area HQ Improvements  
 New London, VA

**BORING LOCATION  
 PLAN**

**DRAWING NO.**  
 2



Legend

BT = Boring Terminated



**FROEHLING & ROBERTSON, INC.**

*Engineering Stability Since 1881*  
 1734 Seibel Drive, NE  
 Roanoke, Virginia 24012-5624 | USA

**DATE:** December 2015

**SCALE:** Not to Scale

**DRAWN:** EKP

62T0505

Hughes Associates Architects  
 VDOT New London Area HQ Improvements  
 New London, Virginia

COMPOSITE  
 SUBSURFACE  
 PROFILE

**DRAWING NO.**

3



**Project No:** 62T0505

**Elevation:**

**Drilling Method:** 2.25" ID HSA

**Client:** Hughes Associates Architects

**Total Depth:** 20.0'

**Hammer Type:** Automatic

**Project:** VDOT New London Area HQ Improvements **Boring Location:** See Boring Location Plan

**Date Drilled:** 12/10/15

**City/State:** New London, Virginia

**Driller:** S. Douglas

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
	0.2	2" Surficial soil				Subsurface water was not encountered immediately upon completion of drilling.
		<b>RESIDUUM:</b> Firm, red brown, moist, SILT (MH) with little fine sand	2-3-4	1.0	7	
				2.5		
	3.0	Stiff, red brown, moist, fine sandy SILT (MH)	3-5-6	3.5	11	
				5.0		
			4-5-8	6.0	13	
				7.5		
	8.0	Loose, orange brown, moist, silty fine SAND (SM)	3-4-6	8.5	10	
				10.0		
			3-3-5	13.5	8	
				15.0		
			2-3-4	18.5	7	
	20.0	Boring terminated at 20 feet		20.0		

BORING\_LOG\_62T-0505.GPJ F&R.GDT 12/15/15

\*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.





**Project No:** 62T0505

**Elevation:**

**Drilling Method:** 2.25" ID HSA

**Client:** Hughes Associates Architects

**Total Depth:** 20.0'

**Hammer Type:** Automatic

**Project:** VDOT New London Area HQ Improvements **Boring Location:** See Boring Location Plan

**Date Drilled:** 12/10/15

**City/State:** New London, Virginia

**Driller:** S. Douglas

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	N-Value (blows/ft)	Remarks
	0.2	2.5" Surficial soil				Subsurface water was not encountered immediately upon completion of drilling.
		<b>RESIDUUM:</b> Stiff to very stiff, red brown, moist, SILT (MH) with little fine sand	1-4-9	1.0	13	
				2.5		
		-with little fine gravel from 3.5 to 5 feet	5-9-14	3.5	23	
				5.0		
	6.0	Very stiff to stiff, red brown, moist, fine sandy SILT (MH)	4-8-11	6.0	19	
				7.5		
			2-5-6	8.5	11	
				10.0		
	12.0	Loose, orange brown, moist, silty fine SAND (SM)				
			3-3-6	13.5	9	
				15.0		
			2-3-4	18.5	7	
	20.0	Boring terminated at 20 feet		20.0		

BORING\_LOG\_62T-0505.GPJ F&R.GDT 12/15/15

\*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.



---

HQ: 3015 DUMBARTON ROAD RICHMOND, VIRGINIA 23228 T 804.264.2701 F 804.264.1202 [www.fandr.com](http://www.fandr.com)

VIRGINIA • NORTH CAROLINA • SOUTH CAROLINA • MARYLAND • DISTRICT OF COLUMBIA

*A Minority-Owned Business*

## **APPENDIX B**



*To protect the health and promote the well-being of all people in Virginia.*

---

Bedford County Health Department  
600 Bedford Avenue  
Bedford, VA 24523  
(540) 586-7952 Voice  
(540) 586-7991 Fax

---

***OSE/PE Sewage Disposal System Construction Permit***

**Well and Sewage Contractors:** Please notify Health Department and OSE or PE 48 hours prior to installation to arrange for inspection

***March 23, 2023***

VA Dept of Transportation  
5507 Thomas Jefferson Road  
Forest VA 24551

RE: 5507 Thomas Jefferson Road, Forest VA 24551  
**Tax Map #:** 153-A-7 (Bedford Co) **RPC# 15300600**  
**HDID:** 109-23-0136 **Reserve:** 50% reserve  
**System Capacity:** 500 gallons per day

Dear Virginia Department of Transportation:

This letter and the attached drawings, specifications, and calculations (6 pages) dated February 3, 2016, constitute your permit to install a sewage disposal system and well if applicable on the property referenced above. Your application for a permit was submitted pursuant to §32.1-163.5 of the Code of Virginia, which requires the Health Department to accept private soil evaluations and designs from an Onsite Soil Evaluator (OSE) or a Professional Engineer working in consultation with an OSE for residential development. VDH is not required to perform a field check to verify the private evaluations of OSEs or PEs and such a field check may not have been conducted for the issuance of this permit.

**The soil absorption area (“site”) and sewage system design were certified by Jay Carter, OSE as substantially complying with the Board of Health’s regulations** (and local ordinances if the locality has authorized the local health department to accept private evaluations for compliance with local ordinances). This permit is issued in reliance upon that certification. VDH hereby recognizes that the soil and site conditions acknowledged by this permit are suitable for the installation of an onsite sewage system. The attached plat shows the approved area for the sewage disposal system; there are additional records on file with the Bedford County Health Department pertaining to this permit, including the Site and Soil Evaluation Report. This construction permit is null and void if any substantial physical change in the soil or site conditions occurs where a sewage disposal system is to be located.

**If modifications or revisions are necessary between now and when you construct your dwelling, please contact the OSE/PE who performed the evaluation and design on which this permit is based.** Should revisions be necessary during construction, your contractor should consult with the OSE/PE that submitted the site evaluation or site evaluation and design. The OSE/PE is authorized to make minor adjustments in the location or design of the system at the time of construction provided adequate documentation is provided to the Bedford County Health Department.

The OSE/PE that submitted the certified design for this permit is required to conduct a final inspection of this sewage system when it is installed and to submit an inspection report and completion statement. As the owner, you are responsible for giving reasonable notice to the OSE/PE of the need for a final inspection. If the designer is unable to perform the required inspection, you may provide an inspection report and completion statement executed by another OSE/PE. The Bedford County Health Department is not required to inspect the installation but may perform an inspection at its sole discretion. No part of this installation shall be covered until it has been inspected by the OSE/PE as noted herein. The sewage system may not be placed into operation until you have obtained an Operation Permit from the Bedford County Health Department.

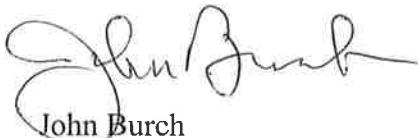
This Construction Permit is null and void if conditions are changed from those shown on your application or if conditions are changed from those shown on the Site and Soil Evaluation Report and the attached construction drawings, specifications, and calculations. VDH may revoke or modify any permit if, at a later date, it finds that the site and soil conditions and/or design do not substantially comply with the Sewage Handling and Disposal Regulations, 12 VAC 5-610-20 et seq., or if the system would threaten public health or the environment.

This permit approval has been issued in accordance with applicable regulations based on the information and materials provided at the time of application. There may be other local, state, or federal laws or regulations that apply to the proposed construction of this onsite sewage system. The owner is responsible at all times for complying with all applicable local, state, and federal laws and regulations. This construction permit is transferrable until expired or deemed null and void. A permit transfer form may be found on the VDH website at <http://www.vdh.virginia.gov/environmental-health/gmp-2015-01-forms/>.

If you have any questions, please contact me.

This permit expires: **September 23, 2024.**

Sincerely,



John Burch  
Environmental Health Specialist  
Bedford County Health Department

### WHAT YOU WILL NEED TO GET YOUR SEPTIC SYSTEM OPERATION PERMIT

- Your system must have a **satisfactory inspection** at the time of installation. This will be done by either a representative of the local Health Department, a private OSE, or a PE, depending on the designer of your permitted system. If your system is designed/inspected by an OSE or PE, they must submit a copy of the inspection results, complete with an as-built diagram, to the Health Department.
- Please ensure that your contractor turns in a **Completion Statement** to the local Health Department after installation.

Allow 5 business days after the last piece of documentation is received for the Operation Permit to be issued. To avoid delays, clearly label each piece of documentation with the property Tax Map/GPIN number and HDID number shown above and on your construction permit. *Please note that due to the individual circumstances of your permit there may be additional required items not covered by this checklist.*

If you have any questions about any of the items on this list, please do not hesitate to contact the Bedford County Health Department at (540) 586-7952.

**PIERSON ENGINEERING AND SURVEYING**

P.O. Box 311 Daleville, VA 24083

(540)966-3027

March 6, 2023

Mr. Todd Fowler  
Bedford County Health Department  
600 Bedford Ave.  
Bedford, VA 24523

Reference: Wastewater Characterization  
Referenced: Previous HDID: 109-16-0025  
Transportation Virginia Department Of  
5507 Thomas Jefferson Road  
Forest, VA 24551  
Tax#: 153-A-7  
Bedford County, VA

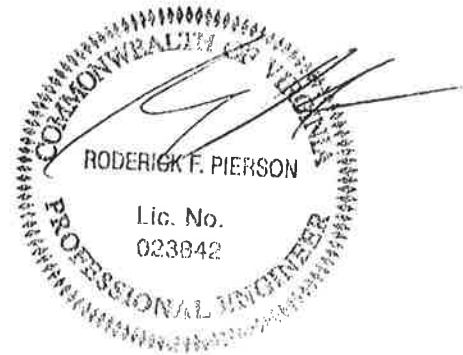
Dear Todd:

This facility was designed for and office with 20 employees with a daily sewage flow of 500 gallons. There has been no substantial change to the drainfield site or site conditions for this project. The wastewater from this facility is no stronger than normal residential strength sewage. Should you have any questions or comments, please do not hesitate to contact me. Thank you for your time and consideration.

Sincerely,



Roderick F. Pierson, L.L.S., P.E.  
Pierson Engineering and Surveying





# AOSE/PE Report for

Construction Permit 1

<b>Location of property:</b>	<b>Lot</b>	<b>Section</b>	<b>Subdivision</b>	<b>County</b>
				BEDFORD
	<b>GPIN or Tax Map #</b>		TM# 153-A-7	
	<b>Latitude/Longitude</b>			

<b>Applicant or Client and address:</b>	<b>Prepared by AOSE/PE (name and address):</b>
Va Dept of Transportaion 5507 Thomas Jefferson Road Forest, VA 24551	Jay E. Carter 170 Hufton Brook Lane Blue Ridge, VA 24064

Date of Report: 3-Feb-15

AOSE/PE Job Number: 160203

Revision Date:

Health Dept. ID No.:

<b>Contents / Index of This Report: 2</b>	
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Soil Information Summary</li> <li><input checked="" type="checkbox"/> Soil Profile Descriptions</li> <li><input checked="" type="checkbox"/> Water Supply Design Specifications</li> <li><input checked="" type="checkbox"/> Primary / Reserve Design Specifications</li> <li><input checked="" type="checkbox"/> Construction Drawings</li> <li><input type="checkbox"/> Site Sketch</li> <li><input type="checkbox"/> Product Specification Sheet</li> <li><input checked="" type="checkbox"/> Other</li> </ul> <p style="text-align: right;">Hughes Associates Drawings</p>	

<b>Certification Statement</b> <sup>3</sup>	<b>ASOE/PE Stamp(s)</b>
<p>I hereby certify that the evaluations and/or designs contained herein were conducted in accordance with the Sewage Handling and Disposal Regulations (12 VAC5-610), the Private Well Regulations (12 VAC5-615), and other applicable policies of the Virginia Department of Health. Furthermore, I certify that my evaluation and/or design contained herein complies with all applicable laws, regulations, and policies implemented by the Virginia Department of Health.</p> <p>I recommend a <u>Construction Permit</u> <sup>4</sup> be <u>Approved.</u> <sup>5</sup></p>	

1 Insert appropriate title: "Construction Permit", "Subdivision Approval", "Certification Letter"  
 2 Examples include: "Soil Information Summary", "Soil Profile Descriptions", "Water Supply Design Specifications", "Primary/Reserve Design Specifications", "Construction Drawings", "Site Sketch", "Product Specification Sheet"  
 3 PE work is regulated by the Department of Professional and Occupational Regulation. This section is considered optional for PEs.  
 4 Fill in this blank with the appropriate term: "certification letter", "construction permit", or "subdivision approval"  
 5 Fill in this blank with the appropriate term: "approved", or "denied"



## Soil Summary Report

### GENERAL INFORMATION

Date February 3, 2016 Submitted To Bedford County Health Department

Applicant Va Dept of Transportation Telephone No. \_\_\_\_\_

Address 5507 Thomas Jefferson Rd Forest, VA 24551

Owner same Address \_\_\_\_\_

Location \_\_\_\_\_

Tax Map 153-A-7 Subdivision \_\_\_\_\_

Block/Section \_\_\_\_\_ Lot \_\_\_\_\_

### SOIL INFORMATION SUMMARY

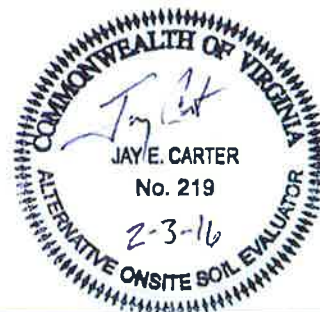
- 1) Position in landscape satisfactory  No  Yes  
Describe side slope
- 2) Slope 8%
- 3) Depth to rock or impervious strata: Max. \_\_\_\_\_ Min. \_\_\_\_\_ None x  
Reserve \_\_\_\_\_
- 4) Depth to seasonal water table (gray mottling or gray color)  No  Yes 66" Inches
- 5) Free water present  No  Yes \_\_\_\_\_ Range in inches
- 6) Soil percolation rate estimated  No  Yes Texture Group III ▼  
Estimated Rate 75 min/inch
- 7) Permeability test performed  No  Yes  
If Yes, note type of test performed and attach \_\_\_\_\_

Site Approved: Drainfield to be placed at 48" depth at site designated on permit.

Site Disapproved:

Reasons for rejection:

- 1)  Position in landscape subject to flooding or periodic saturation.
- 2)  Insufficient depth of suitable soil over hard rock.
- 3)  Insufficient depth of suitable soil to seasonal water table.
- 4)  Rates of absorption too slow.
- 5)  Insufficient area of acceptable soil for required drainfield, and/or Reverse Area.
- 6)  Proposed system too close to well.
- 7)  Other Specify \_\_\_\_\_



(Attach additional pages if necessary)

### SOIL PROFILE DESCRIPTION REPORT

New London VA Dept of Transportation; TM# 153-A-7

Date of Evaluation 12-Jan-16

Where the local health department conducts the soil evaluation, the location of profile holes may be shown on the schematic drawing on the construction permit or the sketch submitted with the application. If soil evaluations are conducted by a private soil scientist, location of profile holes and sketch of the area investigated including all structural features, i.e., sewage disposal systems, wells, etc., within 100 feet of site (See Section 4) and reserve site shall be shown on the reverse side of this page or prepared on a separate page and attached on this form.

See application sketch  
 See construction permit  
 See sketch on reverse side or attached to this form  
 Page \_\_\_\_\_

HOLE #	HORIZON	DEPTH (Inches)	DESCRIPTION of Color, Texture, etc.	TEXTURE GROUP
1	A	0-3	Brown (10YR 5/3) Sandy Loam.	II
	Bt	3-36	Red (2.5YR 5/8) to Yellowish Red (5YR 5/8) Clay Loam. Moderate to weak medium subangular blocky structure. Few mica. Many roots.	III
	BC	36-62	Red (2.5YR 4/8) with few Yellowish (10YR 7/8) parent mottles. Light Clay Loam to Loam. Slightly firm to friable with depth. Common mica.	III-II
	C	62-84	Red (2.5YR 5/8) to Yellowish Red (5YR 5/8) with common Yellow (10YR 7/8) and few White (10YR 8/1) parent mottles. Loam. Many mica. Loam. Very friable.	II
2	A	0-6	Brown (10YR 5/3) Sandy Loam.	II
	Bt	6-41	Red (2.5YR 5/8) Clay Loam. Moderate medium subangular blocky structure. Common mica. Many roots.	II-III
	BC	41-84	Red (2.5YR 5/8) with few Yellow (10YR 7/8) parent mottles. Loam. Slightly firm to friable with depth. Many mica.	II
3	A	0-7	Brown (10YR 5/3) Sandy Loam.	II
	Bt	7-46	Red (2.5YR 5/8) Clay Loam. Moderate to strong medium subangular blocky structure. Many roots.	III
	BC	46-71	Red (2.5YR 5/8) with Yellowish Red (5YR 5/8) with common Yellow (10YR 6/8) parent mottles. Clay Loam. Few non-distinct Gray (10YR 6/1-7/1) redoximorphic mottles starting at 66 inches becoming more distinct and prominent with depth. Moderate medium subangular blocky.	III
4	A	0-8	Brown (10YR 5/3) Sandy Loam.	III
	Bt	8-28	Red (2.5YR 5/8) to Yellowish Red (5YR 5/8) with few Yellow (10YR 7/8) parent mottles. Clay Loam. Few mica. Few stones at depth. Moderate to strong medium subangular blocky.	III
	Bt2	28-72	Red (2.5YR 5/8) with few Yellow (10YR 7/8) parent mottles, and few Black (10YR 2/1) mineral masses. Light Clay Loam to Sandy Clay Loam. Moderate medium subangular blocky.	III-II
	BC	72-84	Red (2.5YR 5/8) with common Yellow (10YR 6/8) parent mottles and few Black (10YR 8/1) mineral masses. Light Clay Loam. Moderate medium subangular blocky.	III

Remarks: Sanitary survey performed and no adverse impacts apparent.



## Sewage Disposal System Construction Specifications

TM 153-A-7

### GENERAL INFORMATION

New     Repair     Expanded  
 Owner Va Dept of Transportation Telephone \_\_\_\_\_  
 Address 5507 Thomas Jefferson Rd Forest, VA 24551  
 For a Type I Sewage disposal system which is to be constructed on/at \_\_\_\_\_  
 Subdivision \_\_\_\_\_ Section \_\_\_\_\_ Block \_\_\_\_\_ Lot \_\_\_\_\_  
 Actual or estimated water use 500 gpd

DESIGN	NOTES
Water Supply: Existing <span style="float: right;">▼</span> To be installed: Class <span style="float: right;">▼</span> cased <span style="float: right;">▼</span> grouted <span style="float: right;">▼</span>	
Building Sewer: <u>3-4"</u> I.D. PVC 40, or equivalent Slope <u>1.25"</u> per 10' (minimum) <input type="checkbox"/> Other _____	
Septic Tank: Capacity <u>1000</u> <span style="float: right;">▼</span> gals. (minimum) <input checked="" type="checkbox"/> Other <u>3"+ inspection port on inlet side of tank brought to surface with threaded cap</u>	
Inlet-outlet structure: <u>PVC 40, 4" tees or equivalent</u> <input checked="" type="checkbox"/> Other <u>2" fall between tees</u>	
Pump and pump station: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes describe & show design If Yes: _____	
Gravity mains: <u>3" or larger I.D., minimum 6" fall per 100', 1500 lb. Crush strength or equivalent.</u> <input type="checkbox"/> Other _____	
Distribution box: <u>Precast concrete with 7+ ports.</u> <input type="checkbox"/> Other _____	
Header lines: <u>4" I.D. 1500 lb. Crush strength plastic or equivalent from distribution box to 2' into absorption trench. Slope 2"</u> Material: <u>minimum.</u> <input type="checkbox"/> Other _____	
Percolation lines: <u>Install Infiltrator Systems EZFlow 1203H-GEO</u> Follow manufacturers devices, materials and specifications <input type="checkbox"/> Other _____	
Absorption trenches: Square ft. required <u>1620</u> ; Depth from ground surface to bottom of trench <u>48"</u> Depth of aggregate <u>none</u> ; Trench length <u>90'</u> ; Trench width <u>3'</u> Number of trenches <u>6</u> ; Center to center spacing <u>9'</u>	



## Abbreviated Design Form

Va Dept. Of Transportation; TM# 70-52.1

For use with gravity and pump drainfields, enhanced flow systems and low pressure distribution systems when applying for a certification letter or subdivision approval.

### Design Basis

A) Estimated Percolation Rate 75

Trench bottom square feet required per 100 gallons

B) (From Table 5.4 Gravelless)  Gravity  LPD 299

C) Number of Gallons 500

### Area Calculations

D) Length of trench 90' (Res 90) Length of available area 95'+

E) Width of trench 3'

F) Number of trenches 6 (Res 3)

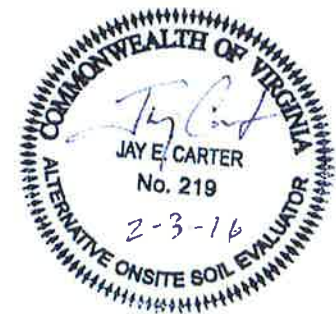
G) Center-to-center spacing 9'

H) Width required 75' Width of available area 100'  
G (F-1) + E

I) Total square footage required 1495  
(line B times line C)

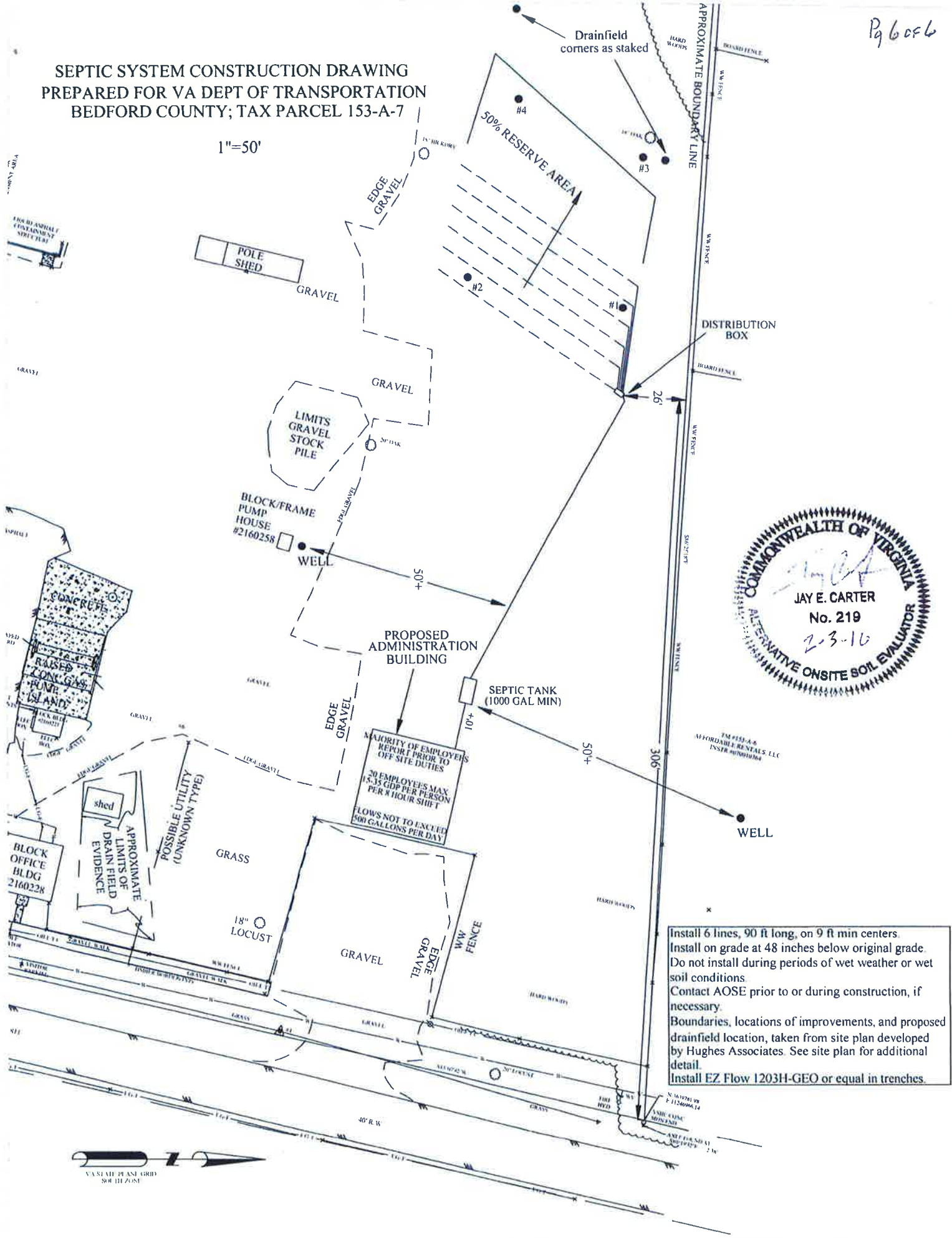
J) Square footage in design 1620  
(D \* E \* F)

K) Is a reserve area required?  No  Yes provided



# SEPTIC SYSTEM CONSTRUCTION DRAWING PREPARED FOR VA DEPT OF TRANSPORTATION BEDFORD COUNTY; TAX PARCEL 153-A-7

1"=50'



Install 6 lines, 90 ft long, on 9 ft min centers.  
 Install on grade at 48 inches below original grade.  
 Do not install during periods of wet weather or wet soil conditions.  
 Contact AOSE prior to or during construction, if necessary.  
 Boundaries, locations of improvements, and proposed drainfield location, taken from site plan developed by Hughes Associates. See site plan for additional detail.  
 Install EZ Flow 1203H-GEO or equal in trenches.



## **APPENDIX C**



# COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION  
1401 EAST BROAD STREET  
RICHMOND, 23219-1939

DAVID R. GEHR  
COMMISSIONER

BILL LINDSEY, CPPO  
ADMINISTRATIVE SERVICES DIVISION  
ADMINISTRATOR

March 16, 1995

## MEMORANDUM

TO: F. C. Altizer, Jr.  
ATTN: J.T. Brewbaker

FROM: C. W. Callen ✓  
Capital Outlay Program Manager

SUBJECT: Lead Evaluation Results  
New London Area Headquarters  
\*2160228 - Supt/Tmkpr Office

Attached for your information and files are the lead inspection results on the above building(s). Those marked with an asterisk tested positive for lead coated material(s).

Any work scheduled in the area(s) that tested positive may require an abatement contract to remove and dispose of these materials.

BLC:gct  
Attachments

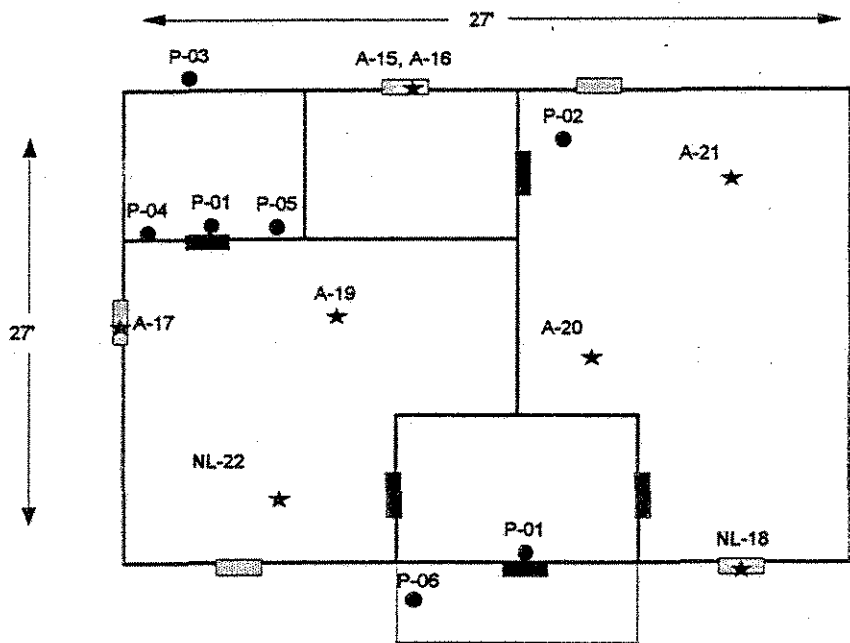
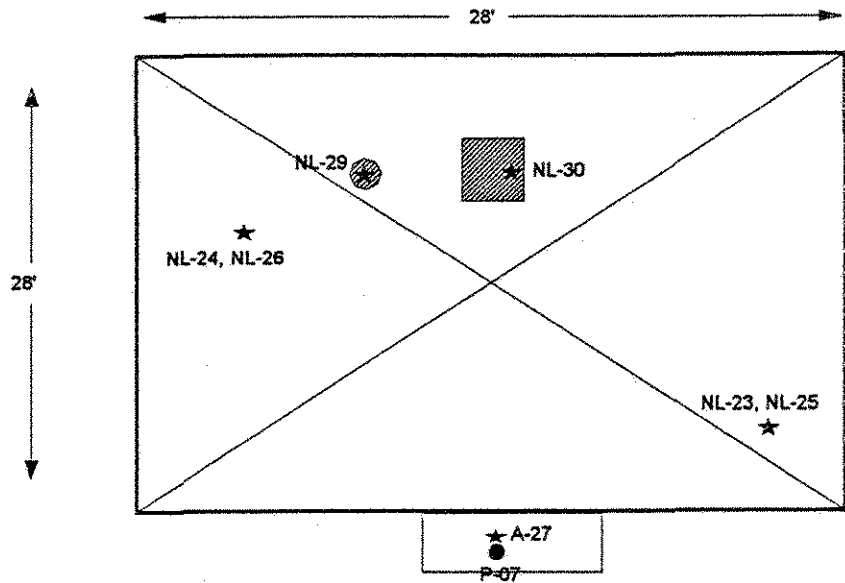
# NEW LONDON RESIDENCY BUILDING 2160228 - INCLUDING ROOF ASBESTOS CONTAINING MATERIALS & LEAD-BASED PAINT

<b>Asbestos</b>	
Asbestos inspection requested?	Yes
Suspect asbestos containing materials?	Yes
Asbestos containing materials present?	Yes
<b>Asbestos containing materials (greater than 1% by volume)</b>	
<u>Material</u>	<u>Quantity</u>
Chimney sealant on roof	4 SF
Sealant on roof pipe	1 SF

<b>Lead</b>		
Lead-based paint inspection requested?	Yes	
Suspect lead-based paint?	Yes	
Lead-based paint present?	Yes	
<b>Lead-based Painted Surfaces (above 0.01% lead content by weight)</b>		
<u>Painted material</u>	<u>Color</u>	<u>Location</u>
Wooden doors & frames	Brown	Throughout
Exterior block wall	White	Building exterior



# NEW LONDON AREA HEADQUARTERS BUILDING 2160228 - ROOF AND INTERIOR ASBESTOS & LEAD SAMPLE LOCATIONS



KEY	
★	ASBESTOS SAMPLE LOCATIONS
●	LEAD-BASED PAINT SAMPLE LOCATIONS

NOTE: PITCHED ROOF WITH THE APEX 5' HIGHER THAN THE BASE

**Clay, Sovich Environmental, Inc.**  
*Environmental & Industrial Hygiene Consultants*

Lead Paint Sample Log

Project: New London Area Headquarters - Bldg 2160028

Date: 1/7/95

Client: VDOT

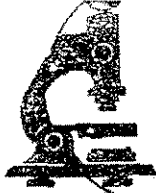
Project No: 261

Project Manager: Mark R. Sovich

Page 1 of 1

Sample Number	Location	Color	Sample Area	% Lead (by weight)
NL-P-01	Wood door	Brown	4 sq in	6.27
NL-P-02	Ceiling	White	4 sq in	<0.01
NL-P-03	Exterior block wall	White	4 sq in	5.22
NL-P-04	Bathroom wall	White	4 sq in	2.72
NL-P-05	Bathroom floor	Gray	4 sq in	1.12
NL-P-06	Porch concrete slab	Gray	4 sq in	4.82
NL-P-07	Porch roof	Gray	4 sq in	0.62
NL-P-08	Metal door	Brown	4 sq in	<0.05

Technician: Mark R. Sovich



# SCHNEIDER LABORATORIES INCORPORATED

104 Berrington Court • Richmond, Virginia • 23221-2702  
804-353-6778 • 800-785-LABS (5227) • (FAX) 804-353-8928

AIHA

Excellence in Service and Technology

NVLAQ

## LABORATORY ANALYSIS REPORT

Lead Analysis by NIOSH 7082-M Method

ACCOUNT: 15-95-1140

DATE COLLECTED: 01/07/95

DATE RECEIVED: 01/31/95

VA DEPT. OF TRANSPORTATION  
ATTN: R. ALLISON 1401 E. BROAD ST.  
RICHMOND, VA 23219

DATE REPORTED: 01/31/95

CUSTOMER PO#: 261

### PROJECT IDENTIFICATION:

PROJECT: 261

NEW LONDON HDQRTS.

LOCATION:

SLI#	CLIENT SAMPLE #	SAMPLE DESCRIPTION	SAMPLE Wt (mg)	DILUTION FACTOR	TOTAL LEAD µg	LEAD CONC.* %
140204	NL-P-01	WOOD DOOR PAINT	331.0	100	20739.5	6.27
140205	NL-P-02	CEILING PAINT	385.0	1	<50.0	<0.01
140206	NL-P-03	EXT. BLOCK WALL PAINT	436.0	100	22743.8	5.22
140207	NL-P-04	BATHROOM WALL PAINT	330.0	10	8988.7	2.72
140208	NL-P-05	BATHROOM FLOOR PAINT	311.0	10	3476.9	1.12
140209	NL-P-06	PORCH CONCRETE SLAB PAINT	576.0	100	27754.5	4.82
140210	NL-P-07	PORCH ROOF PAINT	230.0	2	1416.9	0.62
*140211	NL-P-08	METAL DOOR PAINT	95.0	1	<50.0	<0.05
	QC	50 ug Spike		1	49.8	99.60%
	QC	200 ug Spike		1	217.4	108.71%
	QC	5.0 ppm Std		1	498.0	99.60%
	QC	10.0 ppm Std		1	1019.1	101.91%
	QC	NBS 1648 Std		20	9960.3	99.60%
	QC	NBS 1579 Std		20	12565.9	105.86%

Hud action level is 0.5% lead by weight.

Minimum reporting limit: 50.0 µg Total Lead.

ANALYST: MICHAEL A. MUELLER

DATE ANALYZED: 01/31/95

**NOTE:**

All standard and spike values are reported for Quality Control purposes.

\*Results for QC samples represent Percent Recovery.

REVIEWED BY:

Note: Submitted sample weight for samples denoted with an \* is substantially less than the requirements of standard laboratory protocol. Resubmission of adequate sample (600mg) is strongly suggested.

15-95-1140

Clay, Sovich Environmental, Inc.  
Environmental & Industrial Hygiene Consultants

15-95-1140

ADM. SERV. FEB 02 1995

Lead Paint Sample Log

PRIORITY

Project: New London Area Headquarters

Date: 1/7/95

Client: VDOT

Project No: 261

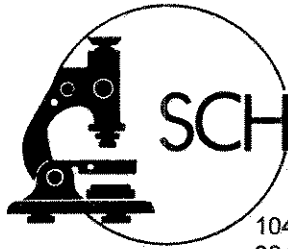
Project Manager: Mark R. Sovich

Page 1 of 1

Sample Number	Location	Color	Sample Area	% Lead (by weight)
NL-P-01	Wood door	Brown		
NL-P-02	Ceiling	White		
NL-P-03	Exterior block wall	White		
NL-P-04	Bathroom wall	White		
NL-P-05	Bathroom floor	Gray		
NL-P-06	Porch concrete slab	Gray		
NL-P-07	Porch roof	Gray		
NL-P-08	Metal door	Brown		

Technician: Mark R. Sovich

ADM. SERV. FEB 02 1995



# SCHNEIDER LABORATORIES INCORPORATED

104 Berrington Court • Richmond, Virginia • 23221-2702  
804-353-6778 • 800-785-LABS (5227) • (FAX) 804-353-6928

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*Excellence in Service and Technology*

NVLAP

## LABORATORY ANALYSIS REPORT

Lead Analysis by NIOSH 7082-M Method

ACCOUNT: 15-95- 1140

DATE COLLECTED: 01/07/95

DATE RECEIVED: 01/31/95

VA DEPT. OF TRANSPORTATION  
ATTN: R. ALLISON 1401 E. BROAD ST.  
RICHMOND, VA 23219

DATE REPORTED: 01/31/95

CUSTOMER PO#: 261

### PROJECT IDENTIFICATION:

PROJECT: 261

NEW LONDON HDQRTRS.

LOCATION:

SLI#	CLIENT SAMPLE #	SAMPLE DESCRIPTION	SAMPLE Wt (mg)	DILUTION FACTOR	TOTAL LEAD µg	LEAD CONC.* %
140204	NL-P-01	WOOD DOOR PAINT	331.0	100	20739.5	6.27
140205	NL-P-02	CEILING PAINT	385.0	1	<50.0	<0.01
140206	NL-P-03	EXT.BLOCK WALL PAINT	436.0	100	22743.8	5.22
140207	NL-P-04	BATHROOM WALL PAINT	330.0	10	8988.7	2.72
140208	NL-P-05	BATHROOM FLOOR PAINT	311.0	10	3476.9	1.12
140209	NL-P-06	PORCH CONCRETE SLAB PAINT	576.0	100	27754.5	4.82
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	QC	50 ug Spike		1	49.8	99.60%
	QC	200 ug Spike		1	217.4	108.71%
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Hud action level is 0.5% lead by weight.  
Minimum reporting limit:50.0 µg Total Lead.

ANALYST: MICHAEL A. MUELLER

DATE ANALYZED: 01/31/95

NOTE: All standard and spike values are reported for Quality Control purposes.

\*Results for QC samples represent Percent Recovery.

REVIEWED BY:

Note: Submitted sample weight for samples denoted with an \* is substantially less than the requirements of standard laboratory protocol. Resubmission of adequate sample (600mg) is strongly suggested.



# COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION  
1401 EAST BROAD STREET  
RICHMOND, 23219-1939

DAVID R. GEHR  
COMMISSIONER

BILL LINDSEY, CPPO  
ADMINISTRATIVE SERVICES DIVISION  
ADMINISTRATOR

March 16, 1995

## MEMORANDUM

TO: F. C. Altizer, Jr.  
ATTN: J. W. Brewbaker

FROM: C. W. Callan *✓*  
Capital Outlay Program Manager

SUBJECT: ASBESTOS EVALUATION RESULTS  
New London Area Headquarters  
Complete inspection, including roof system:  
2160221 - Fuel Station  
\*2160228 - Supt/Tmkpr Office  
  
Complete inspection, excluding roof system:  
2160231 - Equipment Storage #1  
2160238 - Storage #3  
2160245 - Chemical Storage #1  
2160249 - Spreader Rack #1  
2160250 - Spreader Rack #2

Attached for your information and files are the asbestos inspection results on the above building(s). Those marked with an asterisk tested positive for asbestos containing material(s). Please review the section of the report identifying the results.

Work scheduled in the areas(s) that tested positive for asbestos containing materials will require an abatement contract to dispose of these materials.

CWC:gct  
ATTACHMENT

# NEW LONDON RESIDENCY COMPLEX SUMMARY OF ASBESTOS & LEAD INSPECTIONS

---

## Asbestos

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Building	Asbestos Found	Areas Inspected		
		Interior	Exterior	Roof
2160221	No	Yes	Yes	Yes
2160228	Yes	Yes	Yes	Yes
2160231	No	Yes	Yes	No
2160238	No	Yes	Yes	No
2160245	No	Yes	Yes	No
2160249	No	Yes	Yes	No
2160250	No	Yes	Yes	No

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## Lead

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Building	Lead-based Paint Present	Areas Inspected		
		Interior	Exterior	Roof
2160228	Yes	Yes	Yes	Yes

# NEW LONDON RESIDENCY BUILDING 2160228 - INCLUDING ROOF ASBESTOS CONTAINING MATERIALS & LEAD-BASED PAINT

---

## Asbestos

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Asbestos inspection requested?	Yes
Suspect asbestos containing materials?	Yes
Asbestos containing materials present?	Yes

### Asbestos containing materials (greater than 1% by volume)

Material	Quantity
Chimney sealant on roof	4 SF
Sealant on roof pipe	1 SF

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## Lead

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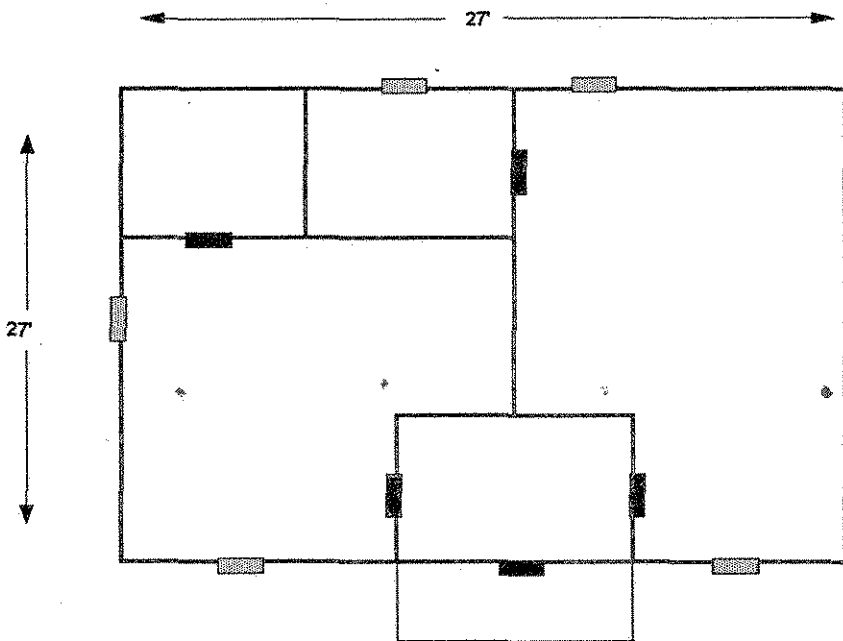
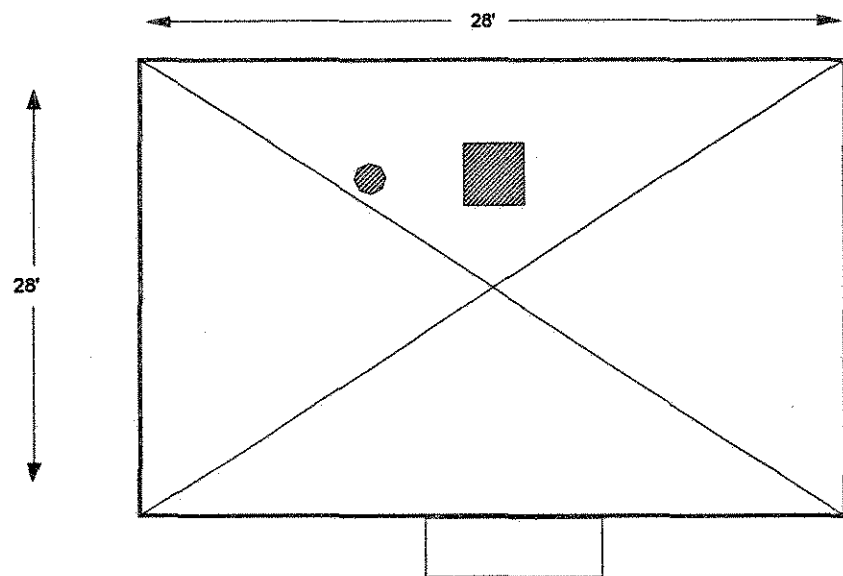
Lead-based paint inspection requested?	Yes
Suspect lead-based paint?	Yes
Lead-based paint present?	Yes

### Lead-based Painted Surfaces (above 0.01% lead content by weight)


Painted material	Color	Location
Wooden doors & frames	Brown	Throughout
Exterior block wall	White	Building exterior



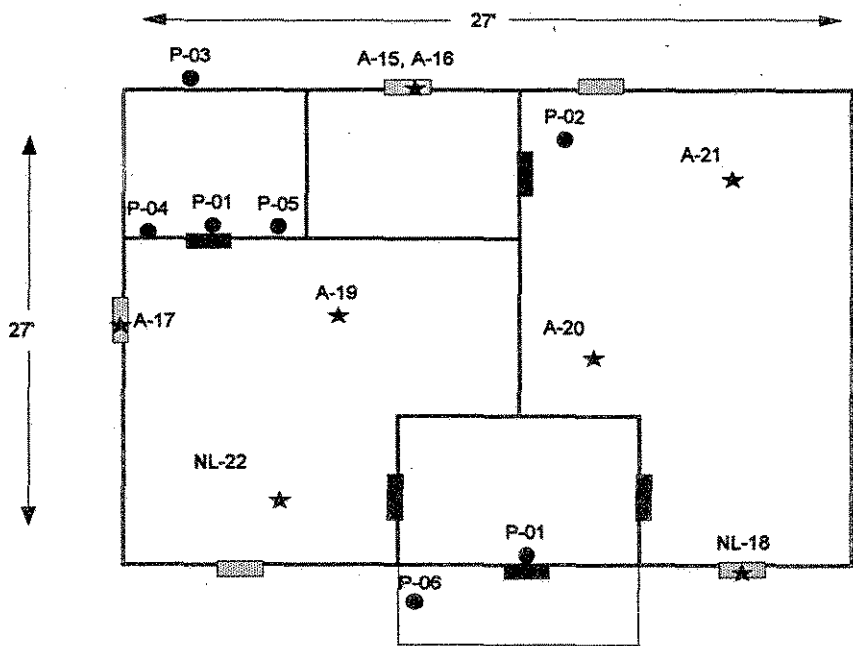
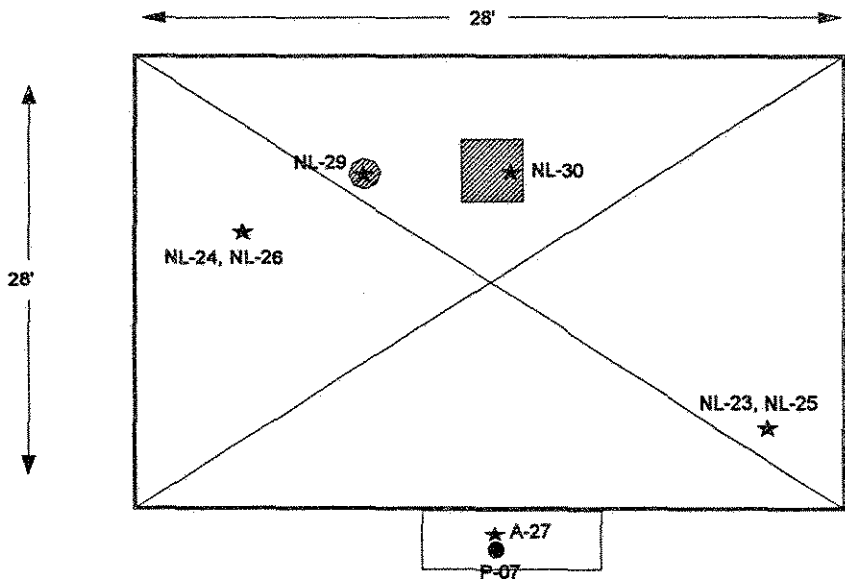
# NEW LONDON AREA HEADQUARTERS BUILDING 2160228 - ROOF AND INTERIOR ASBESTOS MATERIAL LOCATIONS



**KEY - ASBESTOS MATERIALS**

 ROOF SEALANT

# NEW LONDON AREA HEADQUARTERS BUILDING 2160228 - ROOF AND INTERIOR ASBESTOS & LEAD SAMPLE LOCATIONS



KEY	
★	ASBESTOS SAMPLE LOCATIONS
●	LEAD-BASED PAINT SAMPLE LOCATIONS

NOTE: PITCHED ROOF WITH THE APEX 5' HIGHER THAN THE BASE

Clay, Sovich Environmental, Inc.  
Environmental Engineering Consultants

Asbestos Bulk Sample Log

Project: NEW LONDON AH - BLDG 2160128

Date: 11/18/94

Client: VDOT

Project No: 261

Project Manager: M. SOVICH

Page \_\_\_\_\_ of \_\_\_\_\_

Sample Number	Description	Location	Photo No.	Percent Asbestos				Fibrous Materials				Non-Fiber
				A	CH	CR	O	FG	MW	OF	O	
NL-24	SHINGLE	ROOF		N/D	N/D	N/D	N/D					
NL-25	TAR PAPER	ROOF		N/D	N/D	N/D	N/D					
NL-26	TAR PAPER	ROOF		N/D	N/D	N/D	N/D					
NL-27	ROOF PAINT	PORCH ROOF <METAL>		N/D	N/D	N/D	N/D					
<del>NL-28</del>	<del>ROOF PAINT</del>	<del>PORCH ROOF &lt;METAL&gt;</del>		VOID	INSUFFICIENT SAMPLE							
NL-29	SEALANT	ROOF PIPE		N/D	10	N/D	N/D					
NL-30	SEALANT	CHIMNEY <ROOF>		N/D	15	N/D	N/D					

Technician: 

License Number: 1146

Clay, Sovich Environmental, Inc.  
Environmental Engineering Consultants

Asbestos Bulk Sample Log

Project: NEW LONDON AH - BLDG 2160128

Date: 11/18/94

Client: VDOT

Project No: 261

Project Manager: M. SOVICH

Page \_\_\_\_\_ of \_\_\_\_\_

Sample Number	Description	Location	Photo No.	Percent Asbestos				Fibrous Materials				Non-Fiber
				A	CH	CR	O	FG	MW	OF	O	
NL-15	GLAZING	BATHROOM WINDOW		N/D	N/D	N/D	N/D					
NL-16	GLAZING	BATHROOM WINDOW		N/D	N/D	N/D	N/D					
NL-17	CAULKING	WINDOW		N/D	N/D	N/D	N/D					
NL-18	CAULKING	WINDOW		N/D	N/D	N/D	N/D					
NL-19	LINOLEUM	FLOOR		N/D	N/D	N/D	N/D					
NL-20	LINOLEUM	FLOOR		N/D	N/D	N/D	N/D					
NL-21	TEXTURED PLASTER	CEILING		N/D	N/D	N/D	N/D					
NL-22	TEXTURED PLASTER	CEILING		N/D	N/D	N/D	N/D					
NL-23	SHINGLE	ROOF		N/D	N/D	N/D	N/D					

Technician: 

License Number: 1146