

GLENRIDGE MIDDLE SCHOOL

LANDOVER HILLS, MARYLAND

PRINCE GEORGE'S COUNTY PUBLIC SCHOOLS

PROJECT MANUAL

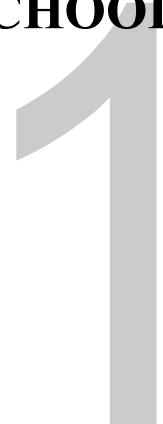
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FOR

BID SET

June 26, 2020



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SECTION 00100 – CONSTRUCTION BID SOLICITATION

Prince Georges County Public Schools is soliciting sealed bids from General Contractors properly licensed under the laws of State of Maryland for

The Glenridge Park property is located at 5211 Flintridge Drive in Landover, Maryland and is positioned between the Woodlawn and Beacon Heights neighborhoods of Prince George's County, Maryland. The new facility will accommodate a State Rated Capacity of 1,200 students on maximum Gross Square of approx. 169,000 square feet. The New Glenridge Middle Area School shall be a high-performance school building with the current US Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver Certification. Sitework shall be in collaboration with Maryland National Capital Park and Planning Commission. The park property is bound by MD Route 410 Veterans Parkway to the northeast, and by residential neighborhoods to the north, east and south. Glenridge Elementary School is adjacent to the southeast corner of the park property and is also accessed from Gallatin Street.

Glenridge Park property is accessed via two distinct entrances; a lower park entrance to the east from Gallatin Street, and an upper entrance to the west from Flintridge Drive. The lower park is organized around a central pond with parking areas, a picnic pavilion and walking paths that meander around the pond and through the surrounding trees. The upper park includes a parking area, multipurpose field, playgrounds, sand volleyball court, basketball court and tennis courts. The upper and lower areas of the park are connected by a network of asphalt walking paths. The northern area of the park is heavily wooded, contains many steep slopes and is not accessible from the adjacent neighborhood streets.

***Special Notice:* Interested Contractors are advised that the anticipated Substantial Completion is May 2023.**

Sealed bids are due in the Procurement office of the Department of Capital Programs, Trailer 6 Prince Georges County Public Schools, Facilities Administration Building, 13300 Old Marlboro Pike, Upper Marlboro, MD 20772-9983 on January 25, 2021. Bids delivered to any other location shall not constitute delivery to the Procurement Office. Sealed bids received prior to the deadline time will be opened publicly and read aloud at the designated bid opening time and location.

Bids received after January 25, 2021 at 2:00 pm will be rejected and returned to the Bidder unopened. Due to Corona Virus restrictions, all public bid openings at PGCPs are cancelled.

A non-mandatory Pre-Bid Conference will be held virtually on December 17, 2020 at 10:00 am.

Site Visit is available the week of December 14 through December 18, 2020. **Attendees should send an email to dcp.procurement@pgcps.org by 10:00 am December 10, 2020. Your email should include at least two (2) dates and times and the number of people within your group.** Attendees are required to report and sign-in at the main office prior to the site tour and

pre-bid conference. Site visits will be self guided. Site visits request received after December 10th will not be considered. COVID-19 Guidelines: Proposers are asked to follow the State of Maryland COVID -19 Social Distancing Guidelines. Anyone who is not wearing the proper Personal Protective Equipment (PPE) will be turned away.

Questions / RFI's must be received no later than January 11, 2021 at 10:00 am. Questions/RFIs shall be submitted in writing to dcp.procurement@pgcps.org. Questions that are deemed to be substantive in nature will be responded to in the form of an addendum which will be emailed and posted on the PGCPS website www.1pgcps.org/cip/. Do not submit questions in PDF format. PGCPS will only recognize questions submitted by the Prime vendors only.

Attendance by all interested parties for both site visit and pre-bid conference is strongly recommended.

Bidding Documents will be released on or after December 2, 2020.

Bidding documents are also available for free download via google drive link:

<https://drive.google.com/drive/folders/14HVVyjjEAXBNrWoKNByykT4Q9khuf5Yr?usp=sharing>

The following information shall be furnished by bidders when obtaining bidding documents:

- a. Bidder's mailing address
- b. Name of Bidder's Representative
- c. Bidder's telephone number
- d. Bidder's email address.

Addendums will be issued by Prince Georges County Public Schools Department of Capital Programs to prospective prime bidders of record ONLY. Sub-Contractors, vendors and material suppliers interested in submitting a proposal for the project must furnish their proposals to prime bidders of record.

Each bid shall be accompanied by bid security in an amount equal to five percent (5%) of the Base Bid amount and ALL alternate bid amounts in the form of a Bid Bond as described in the Supplementary Instructions to Bidders.

Prince Georges County Public Schools reserves the right in its discretion to reject any or all bids and to waive irregularities in any bid. Further, the Board of Education reserves the right to award any combination of alternates or no alternates, which, in its sole discretion, serves the best interests of the County.

Non-Exclusive: The intent of this contract is to provide the Department of Capital Programs with an expedited means of procuring construction services at the lowest cost. This contract is for the convenience of the Board and is considered to be a "Non-Exclusive" use contract. The Board does not guarantee any usage. The Board will not be held to purchase any particular

Brand, in any groups, prices or discount ranges, but reserves the right to purchase any item/items listed in the price schedule submitted.

Contractors in Legal Proceedings With PGCPS: PGCPS recognizes the significant costs and imposition on the time of personnel associated with legal proceedings. Accordingly, PGCPS has adopted a process stating that:

“One factor, among others, that are to be considered when awarding a contract or purchase order is the existence of a pending legal dispute – whether in court or an alternative dispute forum – with any contractor or vendor which has submitted a bid or proposal. Before including consideration of the legal dispute as a factor, the Procurement Officer shall seek the advice of the Office of General Counsel regarding the legal dispute and shall obtain the concurrence of the CEO or his designee.”

Statement of Confidentiality: It is understood and agreed that all information pertinent to this solicitation may contain trade secrets, which are confidential and proprietary. The selected vendor agrees not to disclose or knowingly use any confidential or proprietary information of the Board and/or third-party participant.

Bid submissions are subject to the Maryland Public Information Act (Education Article, Maryland Annotated Code, §10-611, et seq.). In accordance with the Act, certain information is subject to public disclosure. Please be advised that should you deem any portion of your bid as confidential or proprietary, it must be conspicuously indicated on those portions so deemed. However, and in accordance with the Act, you are hereby notified that every portion may still be subject to disclosure under the Act.

FINGERPRINTING AND CRIMINAL BACKGROUND CHECKS

Employees Having Direct Contact with and/or Uncontrolled Access to Students:

- A. Any and all current and future employees of the Vendor who have direct contact with students must have a fingerprinting criminal background check conducted by the Maryland Criminal Justice Information System (CJIS) and the FBI, a Child Protective Services clearance conducted by the Prince George’s County Department of Social Services, and complete the SafeSchools training module – *Prince George’s County Child Abuse: Mandatory Reporting* and any other required training as appropriate.
- B. All background checks must be completed 15 business days prior to beginning work in and around PGCPS property or engaging in any authorized activities involved PGCPS students. The background checks must be completed by the Fingerprinting Office in the Sasscer Administrative Building or by the PGCPS satellite fingerprinting offices located in Prince George’s County. No person may begin working in PGCPS until 15 days after completing the background clearance process (fingerprint and CPS) and required online training through SafeSchools.

- C. Prior to initiating any work at a school building, current and future employees, contractors, subcontractors, agents, volunteers, outsourced temporary staff, consultants and instructors of the Vendor must sign in and sign out via the Raptor Visitor Management System, which requires a copy of their government issued identification.
- D. Pursuant to Md. Education Code Ann. §6-113.2 (Code), a contractor of a Board of Education who provides a services to a school or the students of a school shall meet the requirements set forth for screening its employees assigned to work at a school site to determine whether such employees have a history of child sexual abuse and/or sexual misconduct. Consultant shall be solely responsible for completing the screening set forth in the Code, shall maintain records of employee screenings, and shall make such records available to PGCPS upon request.

Restrictions on Employee Assignments:

Vendors are prohibited from assigning the following persons from working at a PGCPS location:

- A. Registered sex offenders (Maryland Code, Criminal Procedure Article Section 11-722).
- B. Individuals convicted of a crime involving third or fourth degree sexual offence under sections 3-307 or 3-308 of the Criminal Law Article; child sexual abuse under Section 3-602 of the Criminal Law Article; a crime of violence as defined in Section 14-101 of the Criminal law Article; or comparable offenses in another state. (Annotated Code of Maryland, Education Article Section 6-113).
- C. Individuals identified as an alleged abuse or neglecter following completion of a Child Protective Services investigation with a finding of “indicated” child abuse or neglect.

Criminal Background Checks

1. GENERAL PROVISIONS

- A. It is the responsibility of the Vendor to make certain that its employees, contractors, subcontractors, agents, volunteers, outsourced temporary staff, consultants and any instructors meet the background check and training requirements specified below.
- B. The Vendor agrees to provide the designated PGCPS representative with a list of all current employees and an immediate update of changes in personnel, employees, contractors, subcontractors, agents, volunteers, outsourced temporary staff and any instructors. All correspondence should include the following information as applicable:
 - i. title of the project
 - ii. school/office

- iii. solicitation number
- iv. contract number; and
- v. PGCPS representative/project manager.

C. An Executed Contract will not be issued by the PGCPS Purchasing Department until proof has been provided that the background check and training requirements below have been completed 15 days following the issuance of Notice of Award.

Minority Business Enterprise Utilization Requirement: Certified Minority Business Enterprises are encouraged to respond to this solicitation notice. The contractor or supplier who provides materials, supplies, equipment and/or services for this construction project shall attempt to achieve the specific overall MBE goal of thirty **(30)** percent established for this project. All prime contractors, including certified MBE firms, when submitting bids or proposals as general or prime contractors are required to attempt to achieve this goal from State of Maryland certified MBE firms.

The sub goals established for this project are seven **(7)** percent from certified African American-owned businesses and four **(4)** percent from certified Asian-owned businesses.

The bidder or offeror is required to submit with its bid or proposal a completed Attachment A Certified MBE Utilization and Fair Solicitation Affidavit and Attachment B - MBE Participation Schedule, as described in the solicitation documents.

A Performance and a Payment Bond in the forms provided in the Project Manual, each in an amount equal to one hundred percent (100%) of the amount of the Contract, and each with satisfactory corporate surety, must be furnished by the successful bidder prior to execution of the Contract.

Maryland Prevailing Wage Requirement: Prospective bidders are advised that this project **is subject** to and governed by the provisions of Maryland Prevailing Wage Regulation.

DRAFT AIA® Document A701™ - 1997

Instructions to Bidders

for the following PROJECT:

(Name and location or address)

«TBD»

« »

THE OWNER:

(Name, legal status and address)

«Prince Georges County Public Schools»« »

«13300 Old Marlboro Pike

Upper Marlboro, Maryland 20772»

THE ARCHITECT:

(Name, legal status and address)

«»« »

«»

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

SECTION 00210 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

Section 00210, Supplementary Instructions, contains modifications to the basic document, **AIA Document A701, Instructions to Bidders, 1997 Edition**, in the form of additions, deletions and substitutions. Where any part of the basic document is so modified by these Supplementary Instructions, the unaltered provisions shall remain in effect.

ARTICLE 1 - DEFINITIONS

DELETE Paragraph 1.2 in its entirety and, in lieu thereof, SUBSTITUTE the following new Paragraph:

1.2 Except as provided for herein, all definitions set forth in the Conditions of the Contract (General, Supplementary and other conditions) or in other Contract documents are applicable to the bidding documents.

ADD the following new Sub-paragraph as follows:

1.2.1 The following words are intended to mean:

- Furnish (Materials): To supply and deliver to the project ready for installation and in operable condition.
- Install (Services or Labor): To place in final position, complete, anchored, and connected and in operable condition.
- Provide: To furnish and install complete. When neither furnish, install nor provide is stated, provide is implied.

ADD the following to the end of Paragraph 1.4
[Add:] “and applicable law.”

ADD the following to the end of Paragraph 1.8
[Add:] “and applicable law.”

ARTICLE 2 – BIDDER’S REPRESENTATIONS

ADD new Sub-paragraph 2.1.5 as follows:

2.1.5 The Bidder is required to examine carefully in detail the character of the site of the Project, the Contract Documents and all other matters pertinent to the work contemplated. By submitting a bid, the Bidder expressly represents that it has satisfied itself as to the conditions to be encountered, including conditions that are overhead, on the surface and concealed, the character, quality and quantities of work to be done and materials to be furnished, and the requirements of the Contract and Specifications. No allowance or concession will be made for the lack of such information.

The Bidder shall carefully examine all Bidding Documents and materials pertinent thereto, with respect to all the categories of work for which the Owner has advertised and will receive bids, so that it is completely aware and satisfied as to the character, quality and quantities of all work,

materials and for services required or to be provided by the Bidder to perform and complete all work of its Contract on the Project.

Should work to be performed be specified or indicated in more than one Prime Contract and no clarifications received by Addendum prior to the Bid Date, each Prime Contract Bidder so affected who is submitting a bid shall consider the work to be part of its Prime Contract.

A subsequent determination will be made and an amount commensurate to the work to be performed will be deducted from the contractor determined not to be responsible.

The Bidder by submission of its Bid represents that it has visited the site, that it has read the Bidding Documents and understands their full character and intent, that it otherwise complied with the provisions of Article 3, and should the Owner subsequently accept its Bid, no claims, allowances or concessions will be made, accepted or recognized by the Owner at any future time for any additional labor, equipment or materials required, or for any difficulties encountered in the Work, or for the lack of any information which could have been foreseen, apparent or ascertained had the Bidder so complied with Article 3.

The Bidder shall ascertain all governmental and utility requirements with respect to wage scales, materials, labor, safety and sanitation and shall base its bid prices on full compliance therewith. The Bidder has familiarized itself with labor conditions which might affect or influence the performance of the Work.

ARTICLE 3 - BIDDING DOCUMENTS

Paragraph 3.1 - Copies: Sub-paragraph 3.1.1

DELETE Sub-paragraph 3.1.1 in its entirety, and in lieu thereof, SUBSTITUTE the following new Sub-paragraph: 3.1.1

Bidding documents are also available for free download via google drive link:
<https://drive.google.com/drive/folders/14HVVyjjEAXBnrWoKNByykT4Q9khuf5Yr?usp=sharing>

The following information must be furnished by bidders when obtaining bidding documents:

- (a) Name of Bidder's Representative
- (b) Bidder's mailing address
- (c) Bidder's telephone number
- (d) Bidder's email address

All questions pertaining to the Contract Documents and bid submission shall be directed to Capital Programs Procurement at Email: dcp.procurement@pgcps.org

Addendums will be issued by Prince Georges County Public Schools Department of Capital Program Procurement Office to prospective prime bidders of record only. Sub-Contractors, vendors and material suppliers interested in submitting a proposal for the project must furnish their proposals to qualified prime bidders of record.

DELETE Sub-paragraph 3.3.2 in its entirety, and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

3.3.2. Pre-bid substitutions will not be considered. Following the award of contracts, substitutions proposed by the awarded contractors will be considered in accordance with

Division 1 Section “Substitutions” of the Specifications.

DELETE Sub-paragraph 3.3.3 in its entirety.

DELETE Sub-paragraph 3.3.4 in its entirety.

Paragraph 3.4 - Addenda:

ADD new Sub-subparagraph 3.4.1.1 as follows:

3.4.1.1 Clarifications to the Bidding Documents will only be made in writing, by Addenda or Bulletin. Oral statements may not be relied upon and will not be binding or have any legal effect.

DELETE Sub-paragraph 3.4.3 in its entirety and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

3.4.3 Bidders shall submit bidding Request for Information (**RFI**) no later than **than 10:00 a.m. Eastern time, five (5) Business days** prior to the official date for receipt of Bids. Last addenda will be issued no later than **5:00 p.m. Eastern time, three (3) Business days** prior to the official date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

DELETE Sub-paragraph 3.4.4 in its entirety and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge, where indicated on the Bid Form, their receipt. Failure of any bidder to receive any bulletin or Addenda as provided for herein shall not release such bidder from the obligation of their Proposal.

ARTICLE 4 - BIDDING PROCEDURES

Paragraph 4.1 - Preparation of Bids:

ADD the following new sentences to the end of Sub-paragraph 4.1.1:

4.1.1 [*Add:*] "Attention is directed to the Bid Forms bound in the Project Manual/Specification. These forms are for the information and convenience of the Bidder and are not to be detached from the Project Manual/Specification. A separate copy of the Bid Form is furnished with the Bidding Documents. Complete two (2) separate copies of the Bid Form and accompanying documents, execute and submit as specified in the Advertisement for Bid”.

ADD the following new sentence to the end of Sub-paragraph 4.1.5:

4.1.5: [Add:] "Failure to enter an amount or "No Change" for an Alternate shall be construed to mean that no change in the Base Bid is required."

INSERT the following sentence after the second sentence of Sub-paragraph 4.1.7:

4.1.7 [Insert:] "The signature of any person, appearing on the Bid Form, shall be in longhand and in ink."

Paragraph 4.2 - Bid Security:

AMPLIFY Sub-paragraph 4.2.1 as follows:

4.2.1 [Amplify:] "Bid security in the type and amount stated in the Advertisement for Bids shall accompany the Bid. Bid Bonds shall be in the form set forth in the Project Manual. Bid bonds shall name as obligee and checks shall be made payable to Prince George's County Public Schools. Bidders who submit security in cash or check form shall be bound by the conditions set forth in the Bid Bond."

DELETE Sub-paragraph 4.2.2 in its entirety and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

4.2.2 If a Surety Bond is used for the Bid Security it shall be written on a form similar to the enclosed Bid Bond form only, and the Attorney-in-fact who executes the Bond on behalf of the Surety shall affix to the Bond a certified and current copy of his power of attorney.

DELETE Sub-paragraph 4.2.3 in its entirety, and in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

4.2.3 The Owner may declare the Bid Security forfeited to the Owner as liquidated damages if, following the designation, within the firm-bid period, of the Bidder as the apparently lowest responsible Bidder, such Bidder shall thereafter fail to (1) deliver to the Owner within the prescribed time the properly executed Performance Bond and Payment Bond if required by these Contract Documents or (2) if Notice of Intent to Award is given to such Bidder, deliver to the Owner, within the prescribed time, the properly executed counterparts of the construction Agreement and all evidences of insurance as required by these Contract Documents. The Bid Security of all Bidders will be returned (unless previously forfeited as aforesaid) upon (1) the execution of the construction Agreement by the Owner (provided in the case of the Bidder with whom said Agreement is entered into, all required evidences of insurance and Bonds have been previously delivered to the Owner) or (2) the rejection by the Owner of all bids or (3) the expiration of the firm-bid period, including any extensions by operation of law or by mutual consent of the Owner and the apparently lowest responsible Bidder.

Paragraph 4.3 - Submission of Bids:

ADD the following new sentence to the end of Sub-paragraph 4.3.1 as follows:

4.3.1 [Add:] "The Owner shall not be responsible for the opening of Bids not submitted in compliance with these Instructions to Bidders or Supplementary Instruction to Bidders."

ADD new Sub-paragraph 4.3.5 as follows:

4.3.5 [Add:] The documents to be submitted on bid day are as follows:

1. Two (2) Original Bid Form

2. Two (2) Bid Security
3. Two (2) Anti-Bribery Affidavit
4. Two (2) Copies of valid Business License
5. Two (2) Attachment A – Certified Minority Business Enterprise Utilization and Fair Solicitation Affidavit
6. Two (2) Attachment B – MBE Participation Schedule

ADD new Sub-paragraph 4.3.6 as follows:

4.3.6 [Add:] The Owner reserves the right to waive non-material defects or informalities in any and all bids.

ADD new Sub-paragraph 4.3.7 as follows:

4.3.7 [Add:] **Bidder must identify the IFB by placing the IFB number, opening date and time in the lower left hand corner of the envelope.** The bidder is solely responsible for the arrival of the proposal in the DEPARTMENT OF CAPITAL PROGRAMS OFFICE, FACILITIES ADMINISTRATION BUILDING, 13300 OLD MARLBORO PIKE, TRAILER 6, UPPER MARLBORO, MARYLAND 20772-9983, prior to the prescribed deadline for return of bids.

Bids will be opened publicly after the time set for receipt and may be read aloud. Bidders may attend bid openings. Since bids must be received in a sealed envelope, **FACSIMILE COPIES TRANSMITTED VIA "FAX" MACHINES, OR SIMILAR ELECTRONIC METHODS, WILL NOT BE ACCEPTED.**

Due to the COVID-19 restrictions placed on gatherings, PGCPs is not conducting public bid openings.

Paragraph 4.4 - Modification or Withdrawal of Bid:

DELETE Sub-paragraph 4.4.1 in its entirety and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

4.4.1 Bids may not be withdrawn by the Bidder for a period not to exceed 60 calendar days following the actual date of opening thereof. However, if award of Contracts is delayed by a required approval of another government agency, the sale of bonds or the award of a grant or grants, the Bids may not be withdrawn by the Bidder for a period not to exceed 120 days from the date of Bid opening.

DELETE Sub-paragraph 4.4.2 in its entirety and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

4.4.2 Bidders may withdraw Bids at any time up to the scheduled time for opening of Bids. The withdrawal of the Bid prior to the deadline for bidding may occur only by appearing in person, by First-Class mail, or by fax. Bids may not be modified after the deadline for submittal. After the deadline for submittal, no Bid may be withdrawn.

4.4.2 Bids may be withdrawn or modified upon receipt of written request received before the time specified for bid opening. Requests received after bid opening will not be considered

MODIFY Sub-paragraph 4.4.3 as follows:
4.4.3 [*Modify:*] “...fully in conformance with these Bidding

Documents.” ARTICLE 5 -CONSIDERATION OF BIDS

Paragraph 5.1 - Opening of Bids:

DELETE the first part of the first sentence of Paragraph 5.1 up to and including “Advertisement or Invitation to Bid” and begin this sentence as follows:

5.1 “The properly identified Bids.....”

Paragraph 5.2 - Rejection of Bids:

ADD new Sub-paragraph 5.2.1 as follows:

5.2.1 The Owner reserves the right to reject any or all Proposals for one or more Contracts, or parts thereof, or items therein. The Owner reserves the right to disqualify Bids, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices upon the part of the Bidder, or by other means permissible under applicable law.

ADD new Sub-paragraph 5.2.2 as follows:

5.2.2. The BOARD reserves the right to reject any or all bids in whole or in part and to waive any technicalities or informalities as may best serve the interests of the BOARD, to increase or decrease quantities where quantities are shown and may reject any bid which indicates any omission, contains alteration of form or additions not requested, or imposes conditions such as alternate items and may make any award which is deemed to be in the best interest of the BOARD.

Paragraph 5.3 - Acceptance of Bid (Award):

AMPLIFY Sub-paragraph 5.3.1 as follows:

5.3.1 [*Amplify:*] The Owner, before making an award, may require any Bidder, upon at least three (3) days request to present satisfactory evidence, in the form specified by the Owner, of their experience, qualifications, financial ability, and other matters reasonably related to their ability to satisfactorily perform and complete the Work covered by their Proposal.

The Owner reserves the right to consider such matters, facts and circumstances presented by the Bidder, as shall be permitted by Maryland law, in making a determination whether the Bidder is a responsible Bidder. The Owner reserves the right to request such other information or data as they may deem necessary to evaluate the qualifications of the Bidder to satisfactorily perform the functions of the Contractor.

Award: The BOARD reserves the right to award the contract to the lowest responsive and responsible bidder complying with all provisions of the bid, provided the bid price is reasonable and it is in the best interest of the BOARD to accept.

Non-Award: Bidder will be notified via email, if their organization is not selected as the apparent lowest responsive bidder.

ADD new Sub-paragraphs as follows:

5.3.3 After review of the Bids, during the Bid period stipulated in Article 4.4.1, at its sole discretion, the Owner may issue a Notice of Intent to Award and an unexecuted Agreement between Owner and Contractor. Upon receipt of Notice of Intent to Award, the General Contractor shall, within five (5) calendar days, deliver to the Owner the following:

1. Executed Agreement (executed in the required number of counterparts) in the form set forth in the Contract Documents.
2. Performance and Payment Bonds as set forth in the Contract Documents and Article 7 of the Instructions to Bidders.
3. Insurance Certificate, policies or other evidence of insurance set forth in the Contract Documents.
4. Post Bid Information required in Article 6 of the Instructions to Bidders.

Failure of the Bidder to whom Notice of Intent to Award has been given to deliver the above items required by the Contract Documents, within five (5) days, shall constitute grounds for the Owner to declare the Bidder's Bid Security forfeited.

Upon receipt of the documents listed above, the Owner may at its sole discretion, award the Contract by executing the Agreement and issue a written Notice to Proceed which shall establish the start of the Contract duration.

5.3.4 The Owner shall execute and return to the Contractor, one (1) copy of the executed Agreement and shall issue the Notice to Proceed for the Work.

5.3.5 When a Unit Price is rejected by the Owner, any additional work that would have been subject to that unit price shall be subject to Article 7 of the General Conditions for the Contract for Construction and the Supplementary General Conditions.

ADD new Sub-paragraph 5.4 as follows:

Paragraph 5.4 – Late Bids:

5.4.1 Late bids will not be considered for award except under the following conditions:

- .1 The bid was sent by mail and it was determined by the BOARD that the late receipt was due solely to miss handling by the BOARD after receipt of the address specified in the solicitation. If the BOARD declares administrative or liberal leave, scheduled bid openings or receipt of bids will be extended to next business day.
- .2 The **time**, prescribed as **the deadline for submission of bids**, shall be Eastern Time.
- .3 In the event of inclement weather on the date this bid is scheduled to open and the BOARD OF EDUCATION OF PRINCE GEORGE'S COUNTY CENTRAL OFFICES are closed, bid responses will be opened at the FACILITIES ADMINISTRATION BUILDING (FAB) on the next business day. The time of opening on the next business day will be the same as that of the scheduled day. Bid responses will be accepted until the time of opening on the next business day.

ADD new Sub-paragraph 5.5 as follows:

Paragraph 5.5 - Bid Protest:

5.5.1 The Director of Purchasing and Supply Services shall attempt to resolve informally all protest of bid award recommendations.

5.5.1.1 A bidder may protest to the Director of Purchasing and Supply Services a proposed award of a contract. The protest shall be in writing addressed to the Supervisor of Construction Procurement with a copy to the Director of Capital Programs and shall include the following:

- The name address and telephone number(s) of the protester.
- Identification of the solicitation
- Statement of reasons for the protest
- Supporting documentation to substantiate the claim
- The remedy sought

5.5.1.2 The protest must be file with the Purchasing and Supply Services Office within five (5) calendar days of the bid opening or notification to the bidder or offeror that their bid or proposal will be rejected.

5.5.1.3 A vendor who does not file a timely protest before the contract is executed by the Board is deemed to have waived any objection.

5.5.1.4 The Director of Purchasing shall inform the Chief Financial Officer (CFO) upon receipt of the protest.

5.5.1.5 The Director of Purchasing shall confer with the general counsel prior to issuance of a decision regarding disputes of contracts or awards.

5.5.1.6 The Director of Purchasing shall issue a decision in writing. Any decision of a bid award protest may be appealed to the CFO within two (2) days of issuance of the decision by the Director of Purchasing. The decision of the CFO shall be final.

5.5.2 Appeal of Contract Award Decision

5.5.2.1 A vendor who remains unsatisfied after following the procedures may contest a contract awarded by the Board by filing an appeal to the Maryland State Board of Education as provided by Maryland’s public school law.

ADD new Sub-paragraph 5.6 as follows:

Paragraph 5.6 – Errors in the Bid:

5.6.1 Failure of the bidder to thoroughly understand all aspects of the Invitation for Bid before submitting his/her bid will not act as an excuse to permit withdrawal of his/her bid nor secure relief on plea of error. Neither State Law nor Regulation make allowance for errors either of omission or co-mission on the part of the bidders. Obvious, apparent errors in a bid may be corrected or withdrawn upon written approval by the BOARD.

5.6.2 When an error is made in extending total prices the unit bid price will govern. Erasures in bids must be initialed by the bidder. Carelessness in quoting prices or in preparation of bid will not relieve the bidder from performing the contract. Errors discovered after public opening cannot be corrected and the bidder will be required to perform if the bid is accepted

ARTICLE 6 - POST BID INFORMATION

DELETE Paragraph 6.2 - Owner's Financial Capability, in its entirety.

ADD new Sub-paragraph 6.3.1.4 to be as follows:

4. Upon receipt of Notice of Intent to Award, the General Contractor shall, within two (2) business days, deliver to the Owner, the Base Bid Line Item pricing requested in Section 01202 – Base Bid Line Items.

ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

Paragraph 7.1 - Bond Requirements:

DELETE Sub-paragraph 7.1.1 in its entirety and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

7.1.1 Prior to execution of the Contract the successful Bidder shall furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising in the forms included in the Project Manual and each in an amount equal to 100% of the Contract Amount. The Performance Bond shall remain in force and effect until the Contractor's Work has been finally accepted. The Bidder shall pay all premiums in respect of such bonds.

DELETE Sub-paragraph 7.1.2 in its entirety.

REVISE Sub-paragraph 7.1.3 as follows:

7.1.3 *[Revise:]* Bonds shall be secured from a surety company as stipulated in **Section 00800** Supplementary General Conditions.

Paragraph 7.2 - Time of Delivery and Form of Bonds:

DELETE Sub-paragraph 7.2.1 in its entirety and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

7.2.1 The Bidder shall deliver properly executed bonds to the Owner no later than five (5) days after written Notice of Intent to Award is issued.

DELETE Sub-paragraph 7.2.2 in its entirety and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

7.2.2 Bonds shall be written on the Performance Bond form and the Payment Bond form included in these Contract Documents for the amount required in these Contract Documents. The Bonds shall be written in the form included in the Project Manual/Specification and the Bonds shall be executed by or on behalf of the successful Bidder, as Principal, in the following manner:

7.2.2.1 If the successful Bidder is an individual, the Contract Bonds shall be executed by them personally, their signature shall be witnessed and any trade name employed in the conduct of their business shall be stated.

7.2.2.2 If the successful Bidder is a partnership, the Contract Bonds shall be executed in the name of the partnership by each of the Partners, and the signatures of the Partners shall be witnessed.

7.2.2.3 If the successful Bidder is a corporation, the Contract Bonds shall be executed in the name of the corporation:

- (1) by the President or a Vice President and attested by the Secretary or Assistant Secretary and the Corporate Seal shall be attached;
- (2) by a duly authorized agent of the corporation whose authority to act, as of the date of the Contract Bonds, shall be established by proof, satisfactory to the Owner, attached to the Contract Bonds.

7.2.2.4 Execute the Contract Bonds in behalf of the surety in such manner as to legally bind the surety. In the event the execution in behalf of the surety is by an agent or agents, a proper power of attorney, evidencing the authority of such agent or agents, shall be attached to the Contract Bonds. Such power of attorney shall bear the same date as the Contract Bonds to which it is attached.

7.2.2.5 Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

ARTICLE 8 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

DELETE Sub-paragraph 8.1.1 in its entirety and, in lieu thereof, SUBSTITUTE the following new Sub-paragraph:

8.1.1 The Agreement shall be written on the form included in these Contract Documents.

ARTICLE 9 CONSTRUCTION TIME

ADD new Article 9 as follows:

9.1 Pre-Bid Conference: Prospective Bidders and Sub-bidders are invited to attend a Pre-Bid Conference at the time and location stated in the Construction Bid Solicitation during which questions of general and technical nature and other matters regarding the Construction Documents may be raised by those in attendance and discussed with the Owner, the Architect and the Engineers.

9.2 Pre-Construction Conference: Soon after the actual award of the Contract but prior to the start of construction, the Contractor or their representative shall attend a Pre-Construction Conference with representatives of Prince George's County Public Schools. The conference will serve to acquaint the participants with the general plan of Contract administration and requirements under which the construction operation is to proceed and will inform the Contractor, in detail, of the obligations imposed on them and their subcontractors by the Executive Orders concerning Equal Employment Opportunity.

9.2.1 The date, time and place of the conference will be furnished to the Contractor by the Architect or Owner designated Project Manager.

9.3 Contract Time: The Agreement will include a stipulation that the Work shall be substantially complete within the stipulated calendar days of the Notice to Proceed date and be finally completed and closed out within the stipulated calendar days of the Notice to Proceed date.

9.4 Time of Completion:

9.4.1 The Bidder agrees that they will commence work within forty-eight (48) hours following receipt of Notice to Proceed from the Owner and shall be substantially completed within the number of calendar days stipulated on the Notice to Proceed document.

9.4.2 By submitting a Contract Proposal, the Prime Bidder for General Construction, certifies that they shall coordinate the schedule for the construction of this project with all other Contractors including, but not limited to, preparing and updating the Schedule, holding weekly coordination meetings with all Contractors and submitting a copy of the minutes of those meetings to the Architect on a weekly basis.

9.4.3 By submitting a contract proposal, the General Contractor certifies that the Contract Time set forth herein is sufficient to complete its Work.

ARTICLE 10 - GOVERNING LAWS AND REGULATIONS

ADD new Article 10 as follows:

10.1 The Bidder's attention is directed to the fact that all applicable Federal and State laws, municipal ordinances and codes, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Contract throughout, and they are deemed to be included in the Contract the same as though herein written in full.

10.1.1 Attention is directed to the terms, provisions and conditions of the William-Steiger Safety and Health Act of 1970, which is specifically applicable to this Project.

10.2 Federal Occupational Safety and Health Act of 1970 (O.S.H.A.)

10.2.1 Attention is directed to the terms, provisions and conditions of the William-Steiger Safety and Health Act of 1970, which is specifically applicable to this Project.

10.2.2 The Contractor agrees to be bound by them and further agrees and promises to conform and comply with the Standards set forth in the Act.

10.2.3 The Contractor is required to promptly perform all reporting and recording, compliance and safety as required by said Act.

10.2.4 Maryland Occupational Safety and Health (MOSH) "Access to Information About Hazardous and Toxic Substances" Law (Article 89)

10.3 **BUY AMERICAN STEEL** - Refer to Section 01410 of the project specification for additional information

10.4 **MINORITY BUSINESS ENTERPRISE PROGRAM** - Refer to Section 00453 of the project specification for detail program procedure

10.4.1 **Minority Businesses included in the bid package at time of bid opening cannot be changed without prior approval of the Director of Purchasing and Supply Services.**

10.4.2 State Law HB 389 and SB 611, Prime Contractors are prohibited by law from including a certified MBE in a bid or proposal without requesting, receiving, or obtaining the MBE's authorization. The contractor must also use the MBE's services to perform the contract. In addition, the contractor may not pay the MBE solely for the use of its name in the bid or proposal.

10.4.3 Prime Contractor may be prosecuted if they fail to comply with the law. The Board is required under the law to report the violation.

ARTICLE 11 – SPECIAL PROVISIONS

11.1 All Prospective Bidders are advised to be aware of the anticipated construction deadlines noted in the SECTION 00100 – CONSTRUCTION BID SOLICITATION.

11.2 Bidders shall have carefully examined the tentative construction schedule for the work and by submission of a bid, represents that the time set forth for such work is sufficient for the Bidder to complete its work.

11.3 Bidders shall anticipate and forecast potential cost escalation and impact between the award period and the construction performance period. This potential cost escalation shall be included on the base bid. Owner will not entertain or consider prospective contractor's request for contract amount amendment due to bidder's failure to forecast or include potential cost escalation on its bid.

END OF SECTION 00210

SECTION 00300 - BID FORM - GENERAL CONSTRUCTION

DATED: _____
(Bidder to insert date bid submitted)

Bidder's Name _____
(Print or Type)

Bidder's Address _____
(Print or Type)

Name of authorized official signing the signature page (Print or Type)

Phone Number: _____ Email _____

Gentlemen:

This Bid is being submitted in accordance with your Construction Bid Solicitation requesting Bids to be received for the General Construction Work for the _____

Having carefully examined the Contract Documents, bound in the Specifications, and including the Addenda enumerated in the Bid, which are incorporated with these documents indicating various conditions affecting this Contract, the undersigned herein agrees to furnish all materials, perform all labor necessary to complete the Contract for the above named Project in accordance with said Contract Documents for:

Total Base Bid Cost for All General Construction (including Builder's risk and allowance amount (if stipulated))

_____ DOLLARS

(\$ _____).

The total BASE BID, including the cost of all work and the cost of Builder's All Risk Insurance and allowance sum (if stipulated), which shall be provided separately as informational prices. Please Note: Base bid includes all applicable taxes.

Accompanying this Proposal is a certified check, bank cashier's check, bank treasurer's check or Bid Bond required by Paragraph 4.2 of the Instructions to Bidders, which is deposited as a proposal guarantee, and is to be retained by you and applied as provided in Paragraph 4.2.1 of the Instructions to Bidders, in case the undersigned shall default in executing the Contract or in furnishing the required Bonds and insurance certificates within the time specified by these Contract Documents.

The undersigned hereby certifies that this Proposal is genuine and not collusive or made in the interest of, or on behalf of any person, firm or corporation not herein named and that the undersigned has not directly or indirectly induced or solicited any bidder to refrain from bidding and that the undersigned has not in any manner sought by collusion to secure for himself any advantages over any other bidder.

The undersigned, intending to be legally bound, agrees that this Proposal shall be irrevocable and shall remain subject to your acceptance for **90 days** after the date set for bid opening.

It is hereby certified that the undersigned is the only person(s) or entity (ies) interested in this Proposal as Principal, and that the Proposal is made without collusion with any person, firm or corporation. The Bidder hereby agrees to furnish surety company bonds in the form incorporated in the Contract Documents, in the amount of one hundred percent (100%) of the Contract Price for the Performance Bond and the Payment Bond as surety against defects or inferior materials or workmanship which may develop during the period of one (1) year from the date of completion and final acceptance of work performed under the Contract. The Bidder hereby agrees to furnish evidence of require insurance coverage within ten (10) days upon issuance by the Owner of its Notice of Intent to Award.

The Bidder guarantees that, if awarded a Contract, he will furnish and deliver all materials, equipment, conduct required tests, secure all contractor's required permits and licenses, to perform all labor, superintendence, to execute, construct in an expeditious, substantial and workmanlike manner in accordance with the plans and specifications, to the complete satisfaction and acceptance of the Owner for the price herein stated.

The undersigned submits this Proposal with the full knowledge of the Contract requirements and hereby agrees that the Work of this Project, under this Contract, shall be that the renovated building including all of the additions shall be substantially complete within _____ calendar days of the Notice to Proceed date, and the entire project be finally completed and closed out within _____ calendar days of the Notice to Proceed date.

The undersigned Contractor agrees to furnish all labor and materials for any additional work ordered by the Owner and for which no pre-agreed price has been fixed for the net cost of all labor and materials furnished plus 15% for overhead and profit.

The Contract amount stated includes all sales taxes and other taxes for materials and appliances subject to and upon which taxes are levied.

THE BID FORM AND THE FOLLOWING ATTACHMENTS SHALL BE SUBMITTED IN DUPLICATE AS STIPULATED HEREIN:

1. Two (2) Original Bid Form
2. Two (2) Bid Security
3. Two (2) Anti-Bribery Affidavit
4. Two (2) Copies of valid Business License
5. Two (2) Attachment A – Certified Minority Business Enterprise Utilization and Fair Solicitation Affidavit
6. Two (2) Attachment B – MBE Participation Schedule

BASE BID COST BREAKDOWN:

Division 1 – General Requirements:	\$ _____
Division 2 –Existing Conditions	\$ _____
Division 3 –Concrete	\$ _____
Division 4 –Masonry	\$ _____
Division 5 – Metals:	\$ _____
Division 6 – Woods, Plastics & Composites	\$ _____
Division 7 – Thermal & Moisture Protection:	\$ _____
Division 8 – Openings	\$ _____
Division 9 – Finishes	\$ _____
Division 10 – Specialties	\$ _____
Division 11 –Equipment	\$ _____
Division 12 – Furnishings	\$ _____
Division 13 –Special Construction	\$ _____
Division 15 – Mechanical	\$ _____
Division 16 – Electrical	\$ _____
Cost of Builders Risk Insurance	\$ _____

Contingency Allowance (included in base bid
as described in the project specification)

\$ _____

TOTAL BASE BID

\$ _____

END OF COST BREAKDOWN

ADD ALTERNATES: The Instructions to Bidders and the Contract Documents comprising the plans and specifications, and all documents bound therewith, together with all Addenda thereto, shall apply to all Alternate Proposals as listed in Division 1 Section “Alternates”, and as listed below:

Alternate No.	Summary	Add to Base Bid
Alternate Bid No. 1:	Lightning Protection System	Total: \$ _____
Alternate Bid No. 2:	Area Metering	Total: \$ _____
Alternate Bid No. 3:	Landscaping Tier 2 - Provide raised boardwalk and planting at the park to school walkway as indicated in the landscape drawings. Provide bus loop planting as indicated in the landscape drawings. Provide Tire 2 level planting. Change Vinyl coated fence to architectural fence at the basketball court.	Total: \$ _____
Alternate Bid No. 4:	Irrigation for athletic fields	Total: \$ _____
Alternate Bid No. 5:	Entry Tile mural	Total: \$ _____
Alternate Bid No. 6:	Provide sod at athletic fields	Total: \$ _____
Alternate Bid No. 7:	Additional corridor lockers	Total: \$ _____

Alternate Bid No. 8:	Shade sail structures at south courtyard.	Total: \$ _____
Alternate Bid No. 9:	Main gym bleacher bank	Total: \$ _____
Alternate Bid No. 10:	Theatrical lighting	Total: \$ _____
Alternate Bid No. 11:	Concrete pavers at plazas	Total: \$ _____
Alternate Bid No. 12:	Art features (exterior)	Total: \$ _____
Alternate Bid No. 13:	Provide site bollard lighting as indicated	Total: \$ _____
Alternate Bid No. 14:	Rooftop photovoltaic panel array	Total: \$ _____
Alternate Bid No. 15:	Fitness machines in P.E. Courtyard	Total: \$ _____
Alternate Bid No. 16:	Build out community spaces	Total: \$ _____
Alternate Bid No. 17:	Exterior architectural features	Total: \$ _____
Alternate Bid No. 18:	Special building enclosure warranty	Total: \$ _____

UNIT PRICES: The Instructions to Bidders and the Contract Documents comprising the plans and specifications, and all documents bound therewith, together with all Addenda thereto, shall apply to all Unit Prices as listed in Division 1 Section "Unit Prices", and as listed below:

The Owner reserves the right to accept or reject any and all Unit Prices stipulated herein.

Item	Description	UOM	Price
1	Provide removal of rock, including placement as fill on-site with acceptance by the site geotechnical engineer in accordance with specification 31 2000.	CY	\$ 120.00
2	Provide removal of rock, including removal from site, and import fill material in accordance with specification 31 2000.	CY	\$ 140.00
3	Provide excavation beyond subgrade for unsuitable soil, including removal from site, and import of fill material consistent specification 31 2000.	CY	\$ 125.00
4	Provide excavation of suitable soil, including placement as fill on-site with acceptance by the site geotechnical engineer in accordance with specification 31 2000.	CY	\$ 30.00
5	Provide excavation of suitable soil, including removal from site.	CY	\$ 60.00
6	Provide Soil Cement installation in conformance with MDOT-SHA Specifications. The contractor shall provide documentation of 5-years minimum experience performing similar work. For the purposes of bidding, the contractor shall use a cement application rate of 5-percent (5%) at 120 PCF soil weight. The application rate will be pounds per square foot of cement and the application rate shall be determined by a mix design confirmation performed by the contractor.	SF	\$ 10.00
7	Provide concrete sidewalk installation, including stone base and reinforcement, consistent with plan details and in conformance with specification 32 1313.	SF	\$ 8.00

8	Provide heavy duty concrete paving installation, including stone base and reinforcement, consistent with plan details and in conformance with specification 32 1313.	SF	\$ 15.00
9	Provide concrete curb and gutter installation, including stone base, consistent with plan detail and in conformance with specification 32 1315.	LF	\$ 35.00
10	Provide sodding installation in conformance with specification 32 9305.	SY	\$ 10.00
11	Provide full depth pavement repair, consistent with the regular duty paving section as shown on the plans, including removal of full depth paving and removal and disposal from the site.	SY	\$ 85.00
12	Provide 2-inch mill and asphalt overlay, including tack coat, overlay protective membrane and strips, using asphalt surface course per specification 32 1216,	SY	\$ 25.00
13	Provide additional signage, including posts, consistent with MDOT SHA Specifications.	Each	\$ 30.00
14	Provide truncated domes as required for ADA compliant curb ramps.	Each	\$ 55.00
15	Flush cut, remove, and dispose from site, trees up to 6" BDH.	Each	\$ 200.00
16	Flush cut, remove, and dispose from site, trees greater than 6" and up to 12" BDH.	Each	\$ 300.00
17	Flush cut, remove, and dispose from site, trees greater than 12" and up to 18" BDH.	Each	\$ 500.00
18	Flush cut, remove, and dispose from site, trees greater than 18" and up to 24" BDH.	Each	\$ 800.00
19	Flush cut, remove, and dispose from site, trees greater than 24" and up to 30" BDH.	Each	\$ 1,200.00
	Walls		
20	<ul style="list-style-type: none"> 4" CMU wall - unit masonry per sq/ft of wall surface includes mortar/joint reinforcement, bullnose corners, labor, scaffold, and all incidentals. This price does not include grout infill or costs to scaffold. 	SF	\$ 10.34

21	<ul style="list-style-type: none"> 6" CMU wall- unit masonry per sq/ft of wall surface includes mortar/joint reinforcement, bullnose corners, labor, scaffold, and all incidentals. This price does not include grout infill or costs to scaffold. 	SF	\$ 10.77
22	<ul style="list-style-type: none"> 8" CMU wall- unit masonry per sq/ft of wall surface includes mortar/joint reinforcement, bullnose corners, labor, scaffold, and all incidentals. This price does not include grout infill or costs to scaffold. 	SF	\$ 11.20
23	<ul style="list-style-type: none"> 12" CMU wall- unit masonry per sq/ft of wall surface includes mortar/joint reinforcement, bullnose corners, labor, scaffold, and all incidentals. This price does not include grout infill or costs to scaffold. 	SF	\$ 11.95
24	<ul style="list-style-type: none"> 4" face brick 	SF	\$ 12.83
	<ul style="list-style-type: none"> Visual Display Boards 		
25	<ul style="list-style-type: none"> Markerboards 	LF	
26	<ul style="list-style-type: none"> Tackboards 	LF	
	<ul style="list-style-type: none"> Communications Cabling (installed including all accessories and terminations) 		
27	Speaker: provide PA System ceiling-mounted speaker including back box, 200-Ft. of cabling in ¾" conduit and programming	Each	\$ 943.00
28	<ul style="list-style-type: none"> Fire Alarm Pull Station: provide a manual fire alarm pull station complete with 50-Ft. of fire alarm wiring in fire alarm rated MC cabling. Include all testing and programming of device. 	Each	\$ 400.00
29	<ul style="list-style-type: none"> Interior Security Camera: provide interior security camera complete with housing, mount, bracket, licensing. Include 300 Ln/ft of Cat-6 plenum cable. Complete with outlet, cover-plate, backbox, conduit installed concealed, labeling, testing and terminations. 	Each	\$ 1,200.00
30	Exterior Security Camera: provide exterior security camera complete with housing, mount, bracket, licensing. Include 300 Ln/ft of Cat-6 plenum cable. Complete with outlet, cover-plate, backbox, conduit installed concealed, labeling, testing and terminations.	Each	\$ 1,500.00

31	<ul style="list-style-type: none"> Receptacle: provide 12-volt, 20-Ampere (NEMA 5-20R) receptacle and 50-Ln/ft 2#12 & 2#12 GW in MC cabling, and other materials as needed for a complete receptacle. 	Each	\$ 250.00
32	<ul style="list-style-type: none"> Fire Alarm Horn or Speaker/Strobe Unit: provide 110-cd ceiling-mounted strobe and speaker device 50-Ln/ft for fire alarm cabling in fire alarm rated MC cabling. Provide all programming and testing. 	Each	\$250.00
33	<ul style="list-style-type: none"> Fire alarm strobe / Audible device (within 25 feet of another FA device, includes rough in, wire, device and termination 	Each	\$475.00
34	<ul style="list-style-type: none"> Exit Sign: Provide battery-powered exit light with wire guards and 50-Ft. of conduit and wire. 	Each	\$ 450.00
35	<ul style="list-style-type: none"> Light Switch: provide 1P, 20A toggle switch including box, cover plate and 50-Ft. of conduit and wiring 	Each	\$550.00
36	Telephone Drop: Provide a Cat-6 telephone jack complete with testing and termination. Include 300 Ln/ft of Cat-6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.	Each	\$275.00
37	Data Drop: Provide Cat-6 data jack complete with testing and termination. Include 300 Ln/ft of Cat-6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.	Each	\$ 236.00
38	Video Drop: provide an F-Type video jack complete with testing and termination. Include 50 Ln/ft of RG-6 coaxial plenum cable and video tap. Complete with outlet, cover-plate, backbox, conduit installed concealed, labeling, testing and terminations.	Each	\$ 255.00
	Vinyl Coated Chain link fence	Each	\$120.00
39	Up to 6'	LF	\$ 25.14
40	Up to 10'	LF	\$ 43.89

ADDENDA

The undersigned hereby acknowledge receipt of following Addenda and has prepared this bid accordingly:

ADDENDUM # _____ Dated _____ ADDENDUM # _____ Dated _____

ADDENDUM # _____ Dated _____ ADDENDUM # _____ Dated _____

ADDENDUM # _____ Dated _____ ADDENDUM # _____ Dated _____

Bids shall be officially signed in accordance with the Instructions to Bidders, using the applicable portion of the "Signature Pages".

ONLY ATTACH THE APPLICABLE SIGNATURE PAGE.

SIGNATURES

IN WITNESS WHEREOF, the undersigned has caused this Proposal to be executed as of the day and year indicated on the first page hereof.

FOR PARTNERSHIP BIDDER

* _____
(Name of Partnership)

Name of General Partner (Printed)

Witness

By: _____
(Signature of General Partner)

Business Address _____

The Partners constituting the Partnership herein named are:

Partner	Address
Partner	Address
Partner	Address

[Add additional lines for the names and addresses of additional Partners, if there are more than three Partners in the Partnership, by attaching an additional page or pages to this Bid.]

*If a fictitious or trade name is employed by the Partnership in conduct of its business, insert name here:

Next, complete, by deletion as appropriate, the following statement:
Foregoing fictitious or trade name (has) (has not) been registered by the partnership under Maryland Law.

////////////////////////////////////

SIGNATURES

FOR CORPORATE BIDDER

_____ (Name of Corporation)

By: _____
Name of authorized representative from Page 1 *

Attest: _____
Signature of authorized representative *

(CORPORATE SEAL)

Business Address _____

* If a representative other than the President or a Vice President of the Corporation signs this Bid on its behalf, then attach a valid corporate resolution or other appropriate proof, dated prior to or as of the date of the Bid, evidencing authority to execute this Bid on behalf of the Corporation.

** If a representative other than the Secretary, an Assistant Secretary, the Treasurer or an Assistant Treasurer attests to the signature of the corporate representative, then attach a valid corporate resolution or other appropriate proof, dated prior to or as of the date of the Bid, evidencing authority to attest to the execution of this Bid on behalf of the Corporation.



SIGNATURES

FOR LIMITED LIABILITY COMPANY (LLC) BIDDER

(Print Name of Limited Liability Company)

Attest: _____
Name of authorized representative*

By: _____
Signature of authorized representative**

* The individual attesting verifies and represents that the person whose signature is affixed to this Bid on behalf of the Limited Liability Company (LLC) is duly authorized in accordance with the representations hereafter set forth.

** Check the box which applies to this Bid:

The Certificate of Organization provides that the LLC is to be managed by managers, and this Bid has been executed by a Manager fully authorized by the Certificate, by the Operating Agreement and by Resolutions of the LLC. Copies of the relevant documents are provided with the Bid or can be provided upon request within three (3) working days.

The Certificate of Organization does not provide that LLC is to be managed by managers, and this Bid has been executed by a Member fully authorized by the Certificate, by the Operating Agreement and by Resolutions of the LLC. Copies of the relevant documents are provided with the Bid or can be provided upon request within three (3) working days.

This Bid has been executed by a representative of the LLC who is not a Manager or a Member of the LLC, and instead who holds the office of _____ (insert title), and the execution of this Bid is fully authorized by the Certificate, by the Operating Agreement and by Resolutions of the LLC. Copies of the relevant documents are provided with the Bid or can be provided upon request within three (3) working days.

The Bidder and the individuals signing and attesting to the execution of this document further represent that (1) execution of the Bid is carrying on business in the usual way; (2) the LLC authorizes the execution of this Bid even if execution and submission of this Bid is not carrying on business in the usual way for the LLC; and (3) to the best of the individuals' information and

SECTION 00450

DEBARMENT CERTIFICATE

CERTIFICATION REGARDING U.S. GOVERNEMENT DEPARTMENT, SUSPENSION,
INELIGIBILITY, AND VOLUNTARY EXCLUSION

This certification is require by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR, part 85, Section 85.510, Participants' responsibilities. The regulations were published as Part VII of the May 26, 1988, Federal Register (pages 19160-19211).

1. The prospective participant certifies, by submission of this proposal, that none of the principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Local, State or Federal department or agency.
2. Where the prospective participant is unable to certify to any of the state in this certification, such prospective participant shall attach an explanation to this proposal.

Name and Title of Authorized Agency/Organization Representative

Signature

Date

Agency/Organization

*Above certification instituted by the U.S. Department of Education for all grantees and sub grantees as of fiscal year 1990.

DEBARMENT CERTIFICATE

SECTION 00451
STATE OF MARYLAND ANTI-BRIBERY AFFIDAVIT

I HEREBY CERTIFY that

1. I am the _____ and the duly authorized representative of the firm of _____ whose address is _____,

and that I possess the legal authority to make this affidavit on behalf of myself and the firm for which I am acting.

2. Except as described in paragraph 3 below, neither I, nor to the best of my knowledge, the firm, nor any of its officers, directors, or partners, or any of its employees directly involved in obtaining contracts with the State or any county, bi-county, or multi-county agency, or subdivision of the State have been convicted of, or have pleaded nolo contendere to a charge of, or have during the course of official investigation or other proceeding admitted in writing or under oath acts or omissions committed after July 1, 1997, which constitute bribery, attempted bribery, or conspiracy to bribe under the provisions of Article 27 of the Annotated Code of Maryland or under the laws of any state or federal government.

3. (State "none" or, as appropriate, list any conviction, please, or admission described in paragraph 2 above, with the date; court, official, or administrative body; and the sentence or disposition, if any.)

I acknowledge that this affidavit is to be furnished to the requesting agency, to the Secretary of Budget and Fiscal Planning of Maryland, and, where appropriate, to the Board of Public Works and the Attorney General under 16-202, S.F. of the Annotated Code of Maryland. I acknowledge that if the representatives set forth in this affidavit are not true and correct, the State may terminate any contract awarded and take any other appropriate action. I further acknowledge that I am executing this affidavit in compliance with 16-203, S.F. of the Annotated Code of Maryland, which provides certain persons who have been convicted or have admitted to bribery, attempted bribery, or conspiracy to bribe may be disqualified, either by operation or law or after a hearing, from entering into contracts with the State or any of its agencies or subdivisions. I do solemnly declare and affirm under the penalties of perjury that the contents of this affidavit are true and correct.

Witness Signature

Date

ANTI-BRIBERY AFFIDAVIT

SECTION 00452 – STATE OF MARYLAND TAX CERTIFICATION

At the time of bid or proposal for a State procurement contract of \$10,000 or more is submitted, the bidder or offeror shall certify to the procurement officer that the bidder or offeror has paid all taxes, unemployment insurance contribution, reimbursement payments, and interest not barred by limitations and payable to the comptroller, the Department of Assessments and Taxation or the Department of Economic and Employment Development or has provided for payment in a manner satisfactory to the unit responsible for collection; and if the bidder or offeror is a vendor of tangible personal property, the bidder or offeror possesses a valid sales and use tax license under Title 11, Subtitle 7 of the Tax General Article.

I acknowledge that this certificate is to be furnished to the requesting agency, and to the Comptroller of the Treasury, Sales and Use Tax Division under 13-222, S.F. of the Annotated Code of Maryland. I acknowledge that, if the representations set forth in this certificate are not true and correct, the State may terminate any contract awarded and take any other appropriate action.

I do solemnly declare and affirm under the penalties of perjury that the contents of this certificate are true and correct.

Witness

Signature

Name (please type or print)

Name (please type or print)

Title (please type or print)

Title (please type or print)

TAX CERTIFICATION

**SECTION 00453 MINORITY BUSINESS ENTERPRISE PROCEDURES FOR STATE
FUNDED PUBLIC SCHOOL CONSTRUCTION PROJECTS**

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MINORITY BUSINESS ENTERPRISE PROCEDURES FOR STATE FUNDED PUBLIC SCHOOL CONSTRUCTION PROJECTS

BACKGROUND

In 1978, the Maryland General Assembly passed legislation, which was signed into law to establish the State's Minority Business Enterprise Program. This new law set as a goal that at least 10 percent of each unit of State government's total dollar value of procurement contracts for purchases and/or contracts be awarded to minority business enterprises. This law was subsequently modified and the goal was increased to 14 percent. In 2001 the General Assembly significantly changed the program, setting the overall goal to 25 percent with subcontracting sub-goals of 7 percent for certified African American-owned businesses and 10 percent for certified women-owned businesses. In 2012, the General Assembly passed legislation authorizing the Governor's Office of Small, Minority & Women Business Affairs (GOSBA), in consultation with the Maryland Department of Transportation (MDOT) and the Office of the Attorney General, to set the overall aspirational MBE goal every two years. GOMA proposed the increase to 29% after considering several factors prescribed by law, including the relative availability of minority- and women-owned businesses as demonstrated by the State's most recent Disparity Study, as well as the past participation of MBEs in state procurement. The 29% goal will be in place for fiscal years 2014 and 2015 on State-funded contracts.

In 1979, the Rules, Regulations, and Procedures for the Administration of the School Construction Program were revised by the Board of Public Works to require each local board of education to adopt procedures to attempt to include minority business enterprises in State funded school construction projects. The State law was revised and now states: "The Interagency Committee on School Construction (IAC) shall require each local board of education to adopt procedures consistent with this chapter before obtaining funds for public school construction projects".

In May 2007, the Rules, Regulations, and Procedures were replaced by regulations. The regulations concerning project procurement (COMAR 23.03.03) indicate that the State's minority business enterprise goals and procedures apply to all State funded projects, irrespective of procurement method.

In July 2011, a Sub-Goal Directive was issued by the Governor's Office of Small, Minority & Women Business Affairs (GOSBA). This Directive established the process for setting contract-by-contract sub-goals. Sub-goals consistent with demonstrated underrepresentation were pre-established within the Directive.

The 2012 MBE Program statute directs the Board of Public Works (BPW) to issue regulations that:

- Requiring bidders or offerors to complete a bid document that specifies the overall percentage of the contract they agree to achieve through MBEs clarifies that the documents the bidder or offeror submits for its MBE participation commitments must be made part of the executed contract with the State; and
- Requires that every contract that includes MBE participation goals contain a liquidated damages provision in the event that the prime contractor does not comply in good faith with its MBE participation commitments.

The approved 2017 Senate Bill 309/House Bill 433 provides clarification on what constitutes good cause for the purpose of removal of a certified minority business enterprise after the execution of a

contract; prohibiting the failure of a certified minority business to provide a certain bond from being considered nonperformance.

OVERVIEW

This Minority Business Enterprise (MBE) procedure document was originally developed in response to a requirement set forth in the Rules, Regulations, and Procedures for the Administration of the School Construction Program. The MBE requirement was initially established under HB 64, which was passed in the 1978 session of the Maryland General Assembly and signed into law as Chapter 575 of the Acts of 1978.

Since the Board adopted its original Minority Business Enterprise Procedures, there have been changes in State statutes, regulations adopted by the Board of Public Works, procedural requirements, project eligibility requirements and the sub-goals to be set for school construction projects. This revised procedure is consistent with current legislation and the changes to the Code of Maryland Regulations (COMAR) requirements, effective November 7, 2005, May 21, 2007, November 14, 2011 and October 1, 2017.

The revised procedures issued by GOMA in July 2011 provide guidance for establishing overall goals that are contract-specific and reasonable, and for setting subgoals only on contracts that actually have subcontracting opportunities. The procedures for setting overall MBE goals have not changed, however once the overall goal is decided by the Procurement Review Group (PRG), the subgoal analysis must be completed for contracts that have a total potential MBE participation over a minimum threshold amount, as defined for specific Major Industry Categories.

All activities funded through the Public School Construction Program fall within Construction in the Major Industry Categories. In place of the original goals of 7 percent for African American-owned businesses and 10 percent for certified women-owned businesses, the subgoals for construction are now 7 percent for African American-owned businesses and 4 percent for Asian American-owned businesses. Subgoals are not to be set for other minority groups, which may however be represented in the overall contract goal.

1.0 PURPOSE

The purpose of the Procedures is to fulfill the intent of the law and the guidelines issued by GOSBA by setting appropriate goals for minority business enterprise participation in every contract that includes State funding through the Public School Construction Program (PSCP). Local Educational Agencies (LEAs) shall attempt to achieve the result that a minimum of 29 percent of the total dollar value of all construction contracts is made directly or indirectly with certified minority business enterprises when State PSCP funds are utilized, with a minimum of 7 percent from certified African American-owned businesses, a minimum of 4 percent from certified Asian American-owned businesses, and the balance from any certified minority business enterprises. All general contractors, including certified MBE firms, when bidding as general or prime contractors are required to attempt to achieve the MBE subcontracting goals from certified MBE firms.

2.0 EFFECTIVE DATE

These procedures have been adopted for use in Prince George's County and supersede previously utilized MBE procedures, and will take effect on or after on March 1, 2018 in accordance with Title 14, §3, State Finance and Procurement Article, effective July 1, 2011.

3.0 DEFINITIONS

1. **Certification** means the determination that a legal entity is a minority business enterprise consistent with the intent of Subtitle 3 of the State Finance and Procurement Article.
2. **Certified Minority Business Enterprise** means a minority business that holds a certification issued by the Maryland State Department of Transportation (MDOT).
3. **Corporation**, as defined by MDOT, is an artificial person or legal entity created by or under the authority of the laws of any state of the United States, the District of Columbia or a territory or commonwealth of the United States and formed for the purpose of transacting business in the widest sense of that term, including not only trade and commerce, but also manufacturing, mining, banking, insurance, transportation and other forms of commercial or industry activity where the purpose of the organization is profit. For eligibility for certification, disadvantaged and/or minority individuals must own at least 51 percent of the voting stock and at least 51 percent of the aggregate of all classes of stock that have been issued by the corporation. (Note: stock held in trust is not considered as stock held by the disadvantaged businesspersons when computing the business person(s) ownership.)
4. **Managerial Control**, as defined by MDOT, means that a disadvantaged or minority owner(s) has the demonstrable ability to make independent and unilateral business decisions needed to guide the future and destiny of a business. Control may be demonstrated in many ways. For a minority owner to demonstrate control, the following examples are put forth, but are not intended to be all inclusive:
 - a. Articles of Incorporation, Corporate Bylaws, Partnership Agreements and other agreements shall be free of restrictive language which would dilute the minority owner's control thereby preventing the minority owner from making those decisions which affect the destiny of a business;
 - b. The minority owner shall be able to show clearly through production of documents the areas of the disadvantaged business owner's control, such as, but not limited to:
 - 1) Authority to sign payroll checks and letters of credit;
 - 2) Authority to negotiate and sign for insurance and/or bonds;
 - 3) Authority to negotiate for banking services, such as establishing lines of credit; and
 - 4) Authority to negotiate and sign for contracts.

- c. Agreements for support services that do not lessen the minority owner's control of the company are permitted as long as the disadvantaged or minority business owner's authority to manage the company is not restricted or impaired.
5. **Minority Business Enterprise (MBE)** means any legal entity, except a joint venture, that is
 - (a) Organized to engage in commercial transactions, and
 - (b) at least 51 percent owned and controlled by one or more individuals who are socially and economically disadvantaged including:
 - African Americans;
 - Asian Americans;
 - American Indian/Native Americans;
 - Hispanics;
 - Physically or mentally disabled individuals;
 - Women; or A non-profit entity organized to promote the interests of physically or mentally disabled individuals.
 6. **Minority Business Enterprise Liaison** means the employee of the school system designated to administer the Minority Business Enterprise Procedures for State funded public school construction projects.
 7. **Operational Control**, as defined by MDOT, means that the disadvantaged or minority owner(s) must possess knowledge necessary to evaluate technical aspects of the business entity. The primary consideration in determining operational control and the extent to which the disadvantaged or minority owner(s) actually operates a business will rest upon the specialties of the industry of which the business is a part. The minority owner should have a working knowledge of the technical requirements needed to operate in his/her industry. Specifically, in the construction industry and especially among small (one to five person firms) contractors, it is reasonable to expect the disadvantaged or minority owner(s) to be knowledgeable of all aspects of the business. Accordingly, in order to clarify the level of operational involvement which a minority owner must have in a business for it to be considered eligible, the following examples are put forth, but are not intended to be all inclusive:
 - a. The minority owner should have experience in the industry for which certification is being sought; and
 - b. The minority owner should demonstrate that basic decisions pertaining to the daily operations of the business are independently made. This does not necessarily preclude the disadvantaged or minority owner(s) from seeking paid or unpaid advice and assistance. It does mean that the minority owner currently must possess the knowledge to weigh all advice given and to make an independent determination.
 8. **Ownership**, as defined by MDOT, means that:
 - a. The minority owner(s) of the firm shall not be subject to any formal or informal restrictions, which limit the customary discretion of the owner(s). There shall be no restrictions through, for example, charter requirements, by-law provisions, partnership agreements, franchise or

distributor agreements or any other agreements that prevent the minority owner(s), without the cooperation or vote of any non-minority, from making a business decision of the firm.

- b. This means that the disadvantaged or minority persons, in order to acquire their ownership interests in the firm, have made real and substantial contributions of capital, expertise or other tangible personal assets derived from independently owned holdings without benefit of a transfer of assets, gift or inheritance from non-minority persons. Examples of insufficient contributions include a promise to contribute capital, a note payable to the firm or its owners who are not minority persons or the mere participation as an employee rather than as a manager. If the ownership interest held by a disadvantaged or minority person is subject to formal or informal restrictions, such as options, security interests, agreements, etc., held by a non-minority person or business entity, the options, security interests, agreements, etc., held by the non-minority person or business entity must not significantly impair the disadvantaged or minority person's ownership interest.
9. **Partnership** means an unincorporated association of two or more persons to carry on as co-owners of a business for profit. For a partnership to be deemed eligible for certification under the MDOT Program, the disadvantaged or minority person's interest must be at least 51 percent of the partnership capital.
10. **Socially and Economically Disadvantaged** means a citizen or lawfully admitted permanent resident of the United States who is socially disadvantaged and economically disadvantaged. The law establishes the level of personal net worth at \$1,500,000, increased by the Consumer Price Index (CPI); above this net personal worth figure, an individual may not be found to be socially and economically disadvantaged. The current personal net worth figure can be found on the MDOT website at:
<http://www.mdot.maryland.gov/Office%20of%20Minority%20Business%20Enterprise/Resources%20Information>.
11. **Sole Proprietorship**, as defined by MDOT, is a for-profit business owned and operated by a disadvantaged or minority person in his or her individual capacity. For a sole proprietorship to be deemed eligible for certification under the DBE/MBE Program, the disadvantaged or minority person must be the sole proprietor.
12. **Days** means business days unless otherwise specified. Business days are defined as Monday through and including Friday, with the exception of Nationally or State recognized holidays.

4.0 PROJECT MBE GOAL

1. The MBE program requires that all race-neutral measures be considered before making use of race-based measures. Using a combination of race-neutral and race-based measures for each specific school construction project will help ensure that certified MBE firms are afforded the opportunity to submit bids and be utilized to the greatest extent possible.
2. The contractor or supplier who provides materials, supplies, equipment and/or services for this construction project shall attempt to achieve the result that a minimum of __ percent of the total

contract value is with certified Minority Business Enterprises, with a minimum of __ percent from certified African American-owned businesses, a minimum of __ percent from certified Asian American-owned businesses, and the balance from any certified Minority Business Enterprises. All contractors, including certified MBE firms, when submitting bids or proposals as prime contractors, are required to attempt to achieve the MBE goal and sub goals, if applicable, from certified MBEs

3. MBE prime contractors may count their participation on contracts with MBE goals for up to 50% of the established MBE contract goal and 100% of any one contract sub goal. MBE primes are required to adhere to good faith effort requirements for the portion of the contract goal they are not self-performing and are subject to all other MBE contract compliance requirements such as subcontractor prompt payment and monthly reports

5.0 PROJECT CONTRACT STIPULATIONS

- 1) A business that presents itself as a minority business may participate in a project but may not be counted toward MBE participation until it is a certified minority business enterprise. If the MBE is not certified at the time of contract award, it may not be counted at that time. Only the funds paid after MDOT certification can be counted as MBE participation in the project. If a certified MBE fails to meet the standards specified in State Finance and Procurement Article 14-301 (G) and (I), Annotated Code of Maryland, the payments made to the MBE can be recorded and counted under a contract entered into when the MBE was eligible and certified. Ineligibility of an MBE to participate in the MBE program may not be the sole cause of the termination of the MBE contractual relationship for the remainder of the term of the contract.
- 2) Each bid or offer submitted, including a submittal from a certified MBE in response to this solicitation, shall be accompanied by a completed Attachment 1 (State Attachment A) - Certified MBE Utilization and Fair Solicitation Affidavit and a completed Attachment 2 (State Attachment B) - MBE Participation Schedule. These two attachments must be accurate and consistent with each other.
 - a. Attachment 1 (State Attachment A) and Attachment 2 (State Attachment B) shall be submitted with the sealed bid price or proposal at a place, date, and time specified in the solicitation document.
- 3) The submittal of a completed and signed Attachment 1 (State Attachment A) - Certified MBE Utilization and Fair Solicitation Affidavit and a completed and signed Attachment 2 (State Attachment B) - MBE Participation Schedule indicates the bidder's or offeror's recognition and commitment to attempt to achieve the MBE goal and/or MBE sub goals for this project.
 - a. The bidder or offeror recognizes that their efforts made to initiate contact, to solicit, and to include MBE firms in this project will be reviewed carefully and evaluated based upon the actions taken by them prior to and up to 10 days before the bid or proposal opening. Follow-up actions taken by the bidder or offeror within the 10 days prior to the bid opening will also be considered.

- b. Based upon this review and evaluation it will be determined, by the MBE liaison, procurement officer, or a designated person, if a good faith effort was made by the apparent low bidder or apparent successful offeror
- 4) The bidder or offeror must check one of the three boxes on Attachment 1 (State Attachment A), which relates to the level of MBE participation achieved for the project. The bidder's or offeror's signature indicates that in the event that they did not meet the MBE goal or sub goals, if applicable, that:
 - a. They are therefore requesting a waiver, and
 - b. Documentation of their good faith efforts will be provided to the school system staff within 10 days of being notified that they are the apparent low bidder or apparent successful offeror.
- 5) The bidder or offeror must submit Attachment 2 (State Attachment B) (as and when described above), which lists and provides information related to each certified MBE firm that the bidder or offeror will utilize on this project. A completed and accurate Attachment 2 (State Attachment B) is required. All of the work specified to be performed by each MBE firm, the contact information, MDOT certification number, minority code, the dollar values, and percentages must be correct.
- 6) Attachment 2 (State Attachment B) should be completed and submitted with all calculations utilizing the base bid or offer only. A revised Attachment 2 (State Attachment B) should be submitted by the successful bidder or offeror once a determination is made as to the acceptance and/or rejection of any alternates.
- 7) If a request for a waiver has been made, the appropriate box on Attachment 1 (State Attachment A) has been checked and the attachment signed, then the LEA should obtain and review the apparent low bidder's or successful offeror's supporting documentation of the good faith efforts to justify the granting of the waiver, prior to submitting the contract award for approval to the board of education.
- 8) The following documentation shall be considered as part of the contract, and shall be furnished by the apparent low bidder or successful offeror to the MBE Liaison or designated person, within ten (10) working days from notification that the firm is the apparent low bidder or successful offeror:
 - a. A completed Attachment 4 (State Attachment D) - Minority Business Enterprise Subcontractor Project Participation Statement shall be completed and signed by the prime contractor and each MBE firm listed on Attachment 2 (State Attachment B) - MBE Participation Schedule and Attachment 3 (State Attachment C) - Outreach Efforts Compliance Statement shall be signed and completed by the bidder or offeror.
 - b. Notification for purposes of this procedure means the earliest of the following methods of communication: orally in person, orally by telephone, orally by a telephone message, a faxed communication, a letter by date received or an electronic communication.

- c. The ten (10) working days do not include the day the notification is received, weekends or holidays (State or Federal), but the material submitted must be received by the close of business on the tenth day.
- 9) The contractor shall perform the contract in accordance with the representations made in Attachment A – MDOT Certified Minority Business Enterprise Utilization and Fair Solicitation Affidavit and Attachment B – MBE Participation Schedule submitted as part of the bid or proposal.
- 10) Failure to perform the contract as specified and presented in the bid or proposal submission without prior written consent of the owner shall constitute a violation of a material term of the contract.
- 11) The contractor shall structure his/her operations for the performance of the contract to attempt to achieve the MBE goals as stated in the solicitation document.
- 12) The contractor agrees to use his/her best efforts to carry out these requirements consistent with the efficient and effective performance of the contract.
- 13) The contractor must ensure that all certified MBEs shall have the maximum practical opportunity to compete for additional subcontract work under the contract, even after the award of the contract.
- 14) The contractor shall submit monthly to the MBE Liaison or the school system's designated representative a report listing any unpaid invoices, over 30 days old, received from any certified MBE subcontractor, the amount of each invoice and the reason payment has not been made.
- 15) The contractor shall include in its agreements with its certified MBE subcontractors, a requirement that those subcontractors submit monthly to the MBE Liaison or appropriate representative a report that identifies the prime contract and lists all payments received from the contractor in the preceding 30 days, as well as any outstanding invoices, and the amount of those invoices.
- 16) The contractor shall cooperate in any reviews of the contractor's procedures and practices with respect to minority business enterprises, which the MBE Liaison, the PSCP, and/or GOMA may, from time to time, conduct.
- 17) The contractor shall maintain such records as are necessary to confirm compliance with its MBE participation obligations. These records must indicate the identity of certified minority and non-minority subcontractors employed on the contract, the type of work performed by each, and the actual dollar value of work performed. Subcontract agreements documenting the work performed by all MBE participants must be retained by the contractor and furnished to the MBE Liaison and or appropriate representative on request.

- 18) All records concerning MBE participation must be retained by the contractor for a period of five years after final completion of the contract, and will be available for inspection by the MBE Liaison, representatives from the PSCP and/or other designated official entities.
- 19) At the option of the MBE Liaison, or appropriate agency representative, upon completion of the contract and before final payment and/or release of retainage, the contractor shall submit a final report in affidavit form and under penalty of perjury, of all payments made to, or withheld from MBE subcontractors.
- 20) If at any time after submission of a bid or proposal and before execution of a contract, the apparent successful bidder or offeror determines that a certified MBE listed on Attachment B – MBE Participation Schedule has become or will become unavailable, then the apparent successful bidder or offeror shall immediately notify the procurement officer and provide such officer with a reason(s) why the change is requested. Any desired change in Attachment B – MBE Participation Schedule shall be approved in advance by the procurement officer and shall indicate the contractor's efforts to substitute another certified MBE subcontractor to perform the work. Desired changes may occur only upon written approval by the LEA.
- 21) A business that presents itself as a minority business may participate in a project but the contract value may not be counted toward the MBE goal or subgoals, if applicable, until the business is certified by MDOT. If it is not certified at the time of contract award it may not be counted toward the goal or subgoals, if applicable, at that time. Only the funds paid after MDOT certification can be counted toward meeting the MBE goal or subgoals, if applicable. If a certified MBE fails to meet the standards specified in State Finance and Procurement Article.14-301.1, Annotated Code of Maryland, the payments made to the MBE can be recorded and counted under a contract entered into when the MBE was eligible and certified. Ineligibility of an MBE to participate in the MBE program may not be the sole cause of the termination of the MBE contractual relationship for the remainder of the term of the contract.
- 22) Contractors are encouraged to seek additional MBE participation in their contracts during the life of the project. Any additional MBE participation from certified MBEs should be reported to the MBE liaison prior to initiation and should be included in subsequent monthly requisitions for payment.
- 23) The good cause for the removal of a certified MBE after contract execution includes documented nonperformance by the MBE or election by the MBE to cease work on the contract.
- 24) Failure of a certified Minority Business Enterprise to provide a Bond requested by the contractor may not be considered as nonperformance.
- 25) A contractor may not terminate or otherwise cancel the contract of a certified MBE subcontractor listed in the minority business enterprise participation schedule without showing good cause and

obtaining the prior written consent of the MBE liaison and approval of the head of the unit. The unit shall send a copy of the written consent to the Governor's Office of Minority Affairs.

- 26) A minority business enterprise participation schedule may not be amended after the date of contract execution unless the request is approved by the head of the unit and the contract is amended.
- 27) During the performance of a contract, if a certified MBE contractor or subcontractor becomes ineligible to participate in the Minority Business Enterprise Program because one or more of its owners has a personal net worth that exceeds the maximum amount allowable, that ineligibility alone may not cause the termination of the certified minority enterprise's contractual relationship for the remainder of the term of the contract. The certified minority business enterprise's participation under the contract shall continue to be counted toward the program and the contract goals.
- 28) The contractor shall complete the Standard Monthly Contractor's Requisition for Payment (IAC/PSCP Form 306.4), specifically page 3 of 16, Minority Business Enterprise Participation, with each requisition submitted for payment. This submittal should accurately reflect the payments to be made that month to MBEs, and the cumulative total for the period specified. Any and all MBE firms that are identified on Attachment B should be included on page 3 of the first and all subsequent requisitions for payment. Any MBEs identified during the life of the project should be added as soon as the contractor engages them.
- 29) At the completion of the project the contractor shall prepare a written summary of the final certified MBE participation in the contract as compared to the proposed participation at the time of contract award. This should include the name of each certified MBE, the percentage and amount that was anticipated to be paid at the time of contract award, the percentage and amount actually paid, and an explanation of any differences that have occurred. Special attention should be given to any situations where the final payments to any MBE were below the level of commitment at the time of contract award. The summary shall be forwarded to the LEA with the final requisition. The LEA shall include this documentation with the submittal of the close-out paperwork to the PSCP.
- 30) **Regular Dealer**
 - a. Regular Dealer is a firm that owns, operates or maintains a store, a warehouse or any other establishment in which the materials, supplies, articles or equipment are of the general character described by the specifications required under the contract and are bought and kept in stock to be sold or leased to the public in the usual course of business; Does not include a packager, a broker, a manufacturer's representative, or any other person that arranges or expedites transactions. Also, the supplies or materials must be eligible construction items. PSCP does not provide funds for ineligible construction items.

- b. A unit may apply **ONLY 60%** of the cost of materials and supplies provided by the certified MBE if the MBE is a regular dealer for the purposes of achieving the minority business enterprise contract goal. With respect to materials or supplies purchased from certified MBE that is neither a manufacturer nor a regular dealer, a unit may apply the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, fees, or transportation charges for the MBE contract goals, provided a unit determines the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services.

6.0 WAIVER PROCEDURES

- a. If the apparent low bidder or successful offeror has determined that they are unable to meet the overall MBE goal or subgoals, if applicable, for the project at the time of submission of a bid or offer, they must check the box on Attachment A indicating the request for a waiver. The signature recognizes and acknowledges that a request for a waiver is being made. The apparent low bidder or successful offeror will therefore be required to submit information and substantiating documentation that will be reviewed to justify the granting of a waiver.
- b. If the apparent low bidder or successful offeror is unable to achieve the overall MBE contract goal and/or the MBE subgoals, if applicable, from certified African American-owned businesses and/or from certified Asian American-owned businesses, the apparent low bidder or successful offeror shall submit, within 10 business days from notification that the firm is the apparent low bidder or successful offeror, a completed Attachment C - Outreach Efforts Compliance Statement, Attachment D – Subcontractor Project Participation Statement (if applicable), Attachment E - Minority Subcontractor Unavailability Certificate, and Attachment F - MBE Waiver Documentation which shall include the following:
 - 1) A detailed statement of the efforts made by the bidder or offeror to identify and select portions of the work proposed to be performed by subcontractors in order to increase the likelihood of achieving the stated goal;
 - 2) A detailed statement of the efforts made by the bidder or offeror prior to and up to at least ten (10) business days before the bid or proposal opening to solicit minority business enterprises through written notices that describe the categories of work for which subcontracting is being solicited, the type of work to be performed and specific instructions on how to submit a bid or proposal;
 - 3) Follow-up actions taken by the bidder or offeror within the 10 business days prior to the bid or proposal opening will also be considered.
 - 4) A detailed statement of the bidder's or offeror's efforts to make personal contact with MBE firms identified for item (2) above;
 - 5) A record of the name, address, telephone number and dates contacted for each MBE identified under items (2) and (3) above;
 - 6) A description of the information provided to MBEs regarding the drawings, specifications and the anticipated time schedule for portions of the work to be performed;
 - 7) Information on activities to assist minority business enterprises to fulfill bonding requirements or to obtain a waiver of these requirements;
 - 8) Information on activities to publicize contracting opportunities to minority business enterprises, attendance at pre-bid or pre-proposal meetings or other meetings scheduled by the MBE Liaison or designated representative; and

- 9) As to each MBE that placed a subcontract quotation or offer which the apparent low bidder or successful offeror considers not to be acceptable, a detailed statement of reasons for this conclusion.
- c. In addition to any waiver documentation the apparent low bidder or successful offeror shall submit one completed Attachment D - Subcontractor Project Participation Statement for each MBE firm that will participate in the project consistent with the information previously provided at the time of the submission of Attachment B (Original) or the revised Attachment B (Revised), if alternates were accepted.
- d. A waiver of an MBE contract goal or subgoal, if applicable, may be granted by the school system only upon receipt of Attachment C - Outreach Efforts Compliance Statement, Attachment D - Minority Subcontractors Unavailability Statement, and Attachment F - MBE Waiver Documentation as described above in items 1) through 9)
 - 1) The MBE Liaison will review and accept or reject the minority business enterprise material that is submitted, and may obtain legal advice or assistance from their attorney.
 - 2) The MBE waiver request may not be considered unless all of the documentation specified above has been submitted in a timely fashion by the apparent low bidder or successful offeror.
 - 3) Assistance in the review of a request for a waiver (the documentation and justifications) may be requested from the PSCP and/or GOMA.
 - 4) If a determination is made that the apparent low bidder or successful offeror did make a good faith effort, based upon a review of the documentation submitted, then the waiver must be granted. The award of contract shall then be made. The material and information submitted, including the LEA's review and analysis notes and conclusion, shall be retained in the project file.
 - 5) If a determination is made that the apparent low bidder or successful offeror did not make a good faith effort, based upon a review of the documentation submitted, then the waiver should not be granted. The material and information submitted, including the LEA's review and analysis notes and conclusion, shall be retained in the project file. The award of contract shall then be made to the next lowest bidder or offeror, who meets the contractual requirements, including the MBE requirements.
 - 6) When a waiver is requested, a copy of Attachment F - MBE Waiver Documentation, accepted and signed by a school system representative and with the reasons for the determination, shall be forwarded to GOMA and the PSCP within ten (10) business days after approval of the contract award by the board of education. Failure to submit the required documentation within the time frame specified may result in delayed approval of the award of contract by the IAC.

7.0 CONTRACT COMPLINACE LIQUIDATED DAMAGES CLAUSE

- A. This contract requires the contractor to make good faith efforts to comply with the Minority Business Enterprise ("MBE") Program and contract provisions.
- B. The State and the Contractor acknowledge and agree that the State will incur damages, including but not limited to loss of goodwill, detrimental impact on economic development, and diversion of internal staff resources, if the Contractor does not make good faith efforts to comply with the requirements of the MBE Program and MBE contract provisions. The parties further acknowledge and agree that the damages the State might reasonably be anticipated to accrue as a result of such lack of compliance are difficult to ascertain with precision.

- C. Therefore, upon a determination by the State that the Contractor failed to make good faith efforts to comply with one or more of the specified MBE Program requirements or contract provisions, the Contractor agrees to pay liquidated damages to the State at the rates set forth below sections:

SECTION A - FAILURE TO SUBMIT MONTHLY REPORTS

Failure to submit each monthly payment report in full compliance with COMAR 21.11.03.13B (3): **\$168.00** per day until the monthly report is submitted as required.

SECTION B: - FAILURE TO SUBMIT MONTHLY REPORTS

Failure to include in its agreements with MBE subcontractors a provision requiring submission of payment reports in full compliance with COMAR 21.11.03.13B (4): **\$84.00** per MBE subcontractor.

SECTION C: - FAILURE TO COMPLY WITH ADMINISTRATIVE PROVISION OF COMAR 21.11.03.12

Failure to comply with COMAR 21.11.03.12 in terminating, canceling, or changing the scope of work/value of a contract with an MBE subcontractor and/or amendment of the MBE participation schedule: The liquidated damages is the difference between the dollar value of the MBE participation commitment on the MBE participation schedule for that specific MBE firm and the dollar value of the work performed by that MBE firm for the contract.

SECTION D: - FAILURE TO MEET GOAL & SUB-GOAL COMMITMENTS

Failure to meet the Contractor's total MBE participation goal and subgoal commitments: The liquidated damages is the difference between the dollar value of the total MBE participation commitment on the MBE participation schedule and the MBE participation actually achieved

SECTION E: - FAILURE TO PROMPTLY PAY ALL UNDISPUTED AMOUNT TO AN MBE SUB-CONTRATOR

Failure to promptly pay all undisputed amounts to an MBE sub-contractor in full compliance with the prompt payment provisions of this contract: **\$100.00** per day until the undisputed amount due to the MBE subcontractor is paid.

- D. Notwithstanding the use of liquidated damages, the State reserves the right to terminate the contract and exercise all other rights and remedies provided in the contract or by law.”
- E. The Contractor expressly agrees that the State may withhold payment on any invoices as a set-off against liquidated damages owed.

- F. The Contractor further agrees that for each specified violation, the agreed upon liquidated damages are reasonably proximate to the loss the State is anticipated to incur as a result of such violation.

8.0 PROCEDURES FOR SUBMISSION OF REQUEST FOR PROGRESS PAYMENT/REIMBURSEMENT

1. Use IAC/PSCP Form 306.4 Page 3.
2. The Prime Contractor must complete this Form and submit it with each Monthly Requisition/Invoice for Payment. If no MBE Sub-Contractors were utilized on this project (i.e., no MBE goals were set for the project and/or a full waiver was granted), this Form must still be submitted by the Prime Contractor.
 - a. IAC/PSCP Form 306.4 Page 3 must be PROJECT specific – If one bid/contract covers multiple projects (either different schools or scopes of work), this Form must be calculated and submitted by the Prime Contractor on an individual project basis.
 - b. IAC/PSCP Form 306.4 Page 3 must be Prime Contractor/Trade Package specific – If the IAC recognized multiple Prime Contractors and/or Trade Packages, this Form must be completed by each Prime/Trade Contractor recognized by the IAC and submitted.
3. All ORIGINAL MBE Sub-Contractors must be listed on this Form with their full company name, MDOT Certification Number, MDOT Classification and ORIGINAL Contract Amount as stated on MBE Attachments B & D. (ONLY MDOT Certified companies should be listed on this Form.)
4. Any additional MBE Sub-Contractors utilized on a project must be listed on this Form with their full company name, MDOT Certification Number, MDOT Classification and total contract amount. (ONLY MDOT Certified companies should be listed on this Form.)
5. The Prime Contractor should fill in the amount they intend to pay each MBE Sub-Contractor for the current requisition as well as all money paid to date. By signing this Form, the Prime Contractor is certifying their intent to pay the “Amount to be Paid This Requisition”. They are also certifying the distribution of money listed under the “Total Paid to Date” column.
6. The LEA MBE Liaison shall verify each month with the MBE Sub-Contractors that all money listed under the “Total Paid to Date” column has been received from the Prime Contractor. By signing this Form, the LEA MBE Liaison is certifying all MBE Sub-Contractors have been paid all money due to them by the Prime Contractor.

7. The MBE Liaison should also be comparing the current Form with the prior month(s) to make sure information is not being duplicated and/or repeated. Payments to MBE Sub-Contractors should be progressive and recorded.
8. If for any reason, an amount the Prime Contractor listed on the Form as intending to pay the MBE Sub-Contractor was not made, or if the payment amount changed, the LEA MBE Liaison should be inquiring about the change in payment or non-payment to the MBE Sub-Contractor.
9. NO REQUESTS FOR PAYMENT/REIMBURSEMENT SHOULD BE SUBMITTED TO PSCP UNTIL THE PROCEDURES ABOVE HAVE BEEN COMPLETED.

9.0 PROCEDURES FOR CLOSE-OUT SUMMARY SUBMISSION

1. Use IAC/PSCP Form 306.4 Page 3.
2. The Prime Contractor must complete this Form and submit it with the FINAL Requisition to the LEA or upon LEA request. If no MBE Sub-Contractors were utilized on a project (i.e. no MBE goals were set for the project and/or a full waiver was granted), this Form must still be submitted by the Prime Contractor.
 - a. IAC/PSCP Form 306.4 Page 3 must be PROJECT specific – If one bid/contract covers multiple projects (either different schools or scopes of work), this Form must be calculated and submitted by the Prime Contractor on an individual project basis.
 - b. IAC/PSCP Form 306.4 Page 3 must be Prime Contractor/Trade Package specific – If the IAC recognized multiple Prime Contractors and/or Trade Packages, this Form must be completed by each Prime/Trade Contractor recognized by the IAC and submitted.
3. All ORIGINAL MBE Sub-Contractors must be listed on this Form with their full company name, MDOT Certification Number, MDOT Classification and ORIGINAL Contract Amount as stated on MBE Attachments B & D. (ONLY MDOT Certified companies should be listed on this Form.)
4. Any additional MBE Sub-Contractors utilized on a project must be listed on this Form with their full company name, MDOT Certification Number, MDOT Classification and total contract amount. (ONLY MDOT Certified companies should be listed on this Form.)
5. The Final Form 306.4 should reflect ALL money paid to each MBE Sub-Contractor. There is a column on the Form to answer “Yes” or “No” for the MBE Sub-Contractor being paid in full. There is also a column on the Form for the Prime Contractor to state a brief reason if a MBE Sub-Contractor was paid less than the original contract amount stated on MBE

Attachments B & D. By signing this Form, the Prime Contractor is certifying the MBE Sub-Contractors have been paid in full for this project.

6. The LEA MBE Liaison shall verify with the MBE Sub-Contractors that all money listed under the “Total Paid to Date” column has been received and no additional money is owed to them by the Prime Contractor. By signing this Form, the LEA MBE Liaison is certifying all MBE Sub-Contractors have been paid in full by the Prime Contractor for this project.
7. NO CLOSE-OUT SUMMARY SHOULD BE SUBMITTED TO PSCP UNTIL THE ABOVE PROCEDURES HAVE BEEN COMPLETED.

10.0 PROCEDURE ATTACHMENT FORMS

See Attachments A - G.

END OF MBE PROCEDURE

PROJECT: _____

PSC#: _____

Attachment A

CERTIFIED MINORITY BUSINESS ENTERPRISE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT

NOTE: You must include this document with your bid or offer. If you do not submit the form with your bid or offer, the procurement officer shall deem your bid non-responsive or your offer not reasonably susceptible of being selected for award.

* * * * *

Part I.

I acknowledge the:

- Overall certified MBE subcontract participation goal of ____ %.
- The subgoals, if applicable, of:
 - ____ % for certified African American-owned businesses and
 - ____ % for certified Asian American-owned businesses.

I have made a good-faith effort to achieve this goal. If awarded the contract, I will continue to attempt to increase MBE participation during the project.

Part II.

Check ONE Box

NOTE: FAILURE TO CHECK ONE OF BOXES 1, 2, or 3 BELOW WILL RENDER A BID NON-RESPONSIVE OR AN OFFER NOT REASONABLY SUSCEPTIBLE OF BEING SELECTED FOR AWARD

NOTE: INCONSISTENCY BETWEEN THE ASSERTIONS ON THIS FORM AND THE INFORMATION PROVIDED ON THE *MBE PARTICIPATION SCHEDULE* (ATTACHMENT B) MAY RENDER A BID NON-RESPONSIVE OR AN OFFER NOT REASONABLY SUSCEPTIBLE OF BEING SELECTED FOR AWARD

- 1 I have met the overall MBE goal and MBE subgoals for this project. I submit with this Affidavit [Attachment A] the *MBE Participation Schedule* [Attachment B], which details how I will reach that goal.

Or

- 2 After having made a good-faith effort to achieve the overall MBE goal and MBE subgoals for this project, I can achieve partial success only. I submit with this Affidavit [Attachment A] the *MBE Participation Schedule* [Attachment B], which details the MBE participation I have achieved.

I request a partial waiver as follows:

- Waiver of overall MBE subcontract participation goal: ____ %
- Waiver of MBE subcontract participation subgoals, if applicable:

- _____ % for certified African American-owned businesses and
- _____ % for certified Asian American-owned businesses.

Within 10 days of being informed that I am the apparent awardee, I will submit *MBE Waiver Documentation* [Attachment F] (with supporting documentation).

or

- 3 After having made a good faith effort to achieve the overall MBE goal and MBE subgoals for this project, I am unable to achieve any portion of the goal or subgoals. I submit with this Affidavit [Attachment A] the *MBE Participation Schedule* [Attachment B].

I request a full waiver.

Within 10 days of being informed that I am the apparent awardee, I will submit *MBE Waiver Documentation* [Attachment F] (with supporting documentation).

Part III.

I understand that if I am the apparent awardee or conditional awardee, I must submit **within 10 working days** after receiving notice of the potential award or within 10 days after the date of conditional award – whichever is earlier – the:

- *Outreach Efforts Compliance Statement* (Attachment C)
- *Subcontractor Project Participation Statement* (Attachment D)
- *Minority Subcontractors Unavailability Certificate* (Attachment E) (if applicable)
- Any other documentation the Procurement Officer requires to ascertain my responsibility in connection with the MBE participation goal and subgoals

I acknowledge that if I fail to timely return complete documents, the Procurement Officer may determine that I am not responsible and therefore not eligible for contract award. If the contract has been awarded, the award is voidable.

I acknowledge that the MBE subcontractors/suppliers listed in the *MBE Participation Schedule* and any additional MBE subcontractor/suppliers identified in the *Subcontractor Project Participation Statement* will be used to accomplish the percentage of MBE participation that I intend to achieve.

In the solicitation of subcontract quotations or offers, MBE subcontractors were provided the same information and amount of time to respond as were non-MBE subcontractors.

The solicitation process was conducted in such a manner so as to not place MBE subcontractors at a competitive disadvantage to non-MBE subcontractors.

I solemnly affirm under the penalties of perjury that this Affidavit is true to the best of my knowledge, information, and belief.

Bidder/Offeror Name

Affiant Signature

Address

Printed Name & Title

Address (continued)

Date

**ATTACHMENT B
MBE PARTICIPATION SCHEDULE**

REVISED

This document must be included with the bid or offer. If the bidder or offeror fails to submit this form with the bid or offer as required, the procurement officer shall deem the bid non-responsive or shall determine that the offer is not reasonably susceptible of being selected for award.

1. Prime Contractor's Name	2. Prime Contractor's Address/Telephone Number
3. Project/School Name	4. Project/School Location
5. LEA Name: PSC Number:	6. Base Bid Amount \$ _____ Acceptance Alternates \$ _____ Total \$ _____

7a. Minority Firm Name: _____
 Minority Firm Address: _____ Telephone Number: _____
 MDOT Firm Certification Number: _____ NAICS Code: _____
 African American Asian American Native American Women Hispanic Disabled

Subcontractor Firm (Select One)	Allowable Percentage	Percentage of Total Contract	Subcontractor Dollar Amount	Participation Amount
MDOT Certified Firm	100%		\$ _____	\$ _____
MDOT Certified Prime Contractor	50% of established goal OR		\$ _____	\$ _____
	100% of one subgroup contract subgoal			
MDOT Certified Supplier, Wholesaler and Regular Dealer	60%		\$ _____	\$ _____

7b. Minority Firm Name: _____
 Minority Firm Address: _____ Telephone Number: _____
 MDOT Firm Certification Number: _____ NAICS Code: _____
 African American Asian American Native American Women Hispanic Disabled

Subcontractor Firm (Select One)	Allowable Percentage	Percentage of Total Contract	Subcontractor Dollar Amount	Participation Amount
MDOT Certified Firm	100%		\$ _____	\$ _____
MDOT Certified Prime Contractor	50% of established goal OR		\$ _____	\$ _____
	100% of one subgroup contract subgoal			
MDOT Certified Supplier, Wholesaler and Regular Dealer	60%		\$ _____	\$ _____

7c. Minority Firm Name: _____
 Minority Firm Address: _____ Telephone Number: _____
 MDOT Firm Certification Number: _____ NAICS Code: _____
 African American Asian American Native American Women Hispanic Disabled

Subcontractor Firm (Select One)	Allowable Percentage	Percentage of Total Contract	Subcontractor Dollar Amount	Participation Amount
MDOT Certified Firm	100%		\$ _____	\$ _____
MDOT Certified Prime Contractor	50% of established goal OR		\$ _____	\$ _____
	100% of one subgroup contract subgoal			
MDOT Certified Supplier, Wholesaler and Regular Dealer	60%		\$ _____	\$ _____

8. MBE Total Amount	9. Total MBE Percent of Entire Contract
---------------------	---

10. Form Prepared by: Name: _____ Title: _____ Date: _____	11. Reviewed and Accepted by Board of Edu. MBE Liaison Name: _____ Title: _____ Date: _____
---	--

Total MBE Participation:	\$ _____	_____ %
Total African-American Participation:	\$ _____	_____ %
Total Asian-American MBE Participation:	\$ _____	_____ %
Total Other Participation:	\$ _____	_____ %

Outreach Efforts Compliance Statement

****Complete and submit this form within 10 business days of notification of apparent award

In conjunction with the bid or offer submitted in response to the solicitation for <<project name>> / <<Solicitation No.>>, I affirm the following:

- 1. Bidder/Offeror identified opportunities to subcontract in these specific work categories (extend list as needed):
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____

2. Attached to this form are copies of written solicitations (with bidding instructions) used to solicit certified MBEs for these subcontract opportunities.

- 3. Bidder/Offeror made the following attempts to contact personally the solicited certified MBEs (extend list as needed):
 - a. _____
 - b. _____
 - c. _____

- 4. Select ONE of the following:
 - a. This contract does not involve bonding requirements.
 - OR**
 - b. Bidder/Offeror assisted certified MBEs to fulfill or seek waiver of bonding requirements (*describe efforts*).

- 5. Select ONE of the following:
 - a. Bidder/Offeror did/did not attend the pre-bid/proposal conference.
 - OR**
 - b. No pre-bid/proposal conference was held.

Bidder/Offeror Printed Name

By: _____
Signature: _____
Title: _____
Date: _____

Address: _____

MBE- Attachment D-1

MINORITY BUSINESS ENTERPRISES SUBCONTRACTOR PROJECT PARTICIPATION STATEMENT

PROJECT/ SCHOOL NAME: _____

PROJECT/ SCHOOL LOCATION: _____

LEA: _____

NAME OF PRIME CONTRACTOR: _____

NAME OF MBE SUBCONTRACTOR: _____

MDOT Certification Number

NAICS Code

1. Work/Services to be performed by MBE Subcontractor: _____

2. Subcontract Amount: \$ _____

3. Bonds - Amount and type required of Subcontractor if any: _____

4. MBE Anticipated or Actual Commencement Date: _____ Completion Date: _____

5. This MBE subcontract represents the following percentage of the total contract cost: _____

6. This is an African American Firm: Yes _____ No _____

7. This is an Asian American Firm: Yes _____ No _____

8. This is a Native American, Hispanic or Disabled Firm: Yes _____ No _____

(Circle One)

The undersigned subcontractor and prime contractor will enter into a contract for the work/service indicated above upon the prime contractor's execution of a contract for the above referenced project with the Board of Education. The undersigned subcontractor is a MDOT certified Minority Business Enterprise. The terms and conditions stated above are consistent with our agreements.

Signature of Subcontractor: _____

Date: _____

=====

The term and conditions stated above are consistent with our agreements.

Signature of Prime Contractor: _____

Date: _____

State Attachment E

MBE Subcontractor Unavailability Certificate

1. It is hereby certified that the firm of _____
 (Name of Minority firm)
 located at _____
 (Number) (Street)

 (City) (State) (Zip)

was offered an opportunity to bid on Solicitation No. _____
 in _____ County by _____
 (Name of Prime Contractor's Firm)

2. _____ (Minority Firm), is either unavailable for the
 work/service or unable to prepare a bid for this project for the following reason(s):

Signature of Minority Firm's MBE Representative **Title** **Date**

MDOT Certification # _____ Telephone # _____

3. To be completed by the prime contractor if Section 2 of this form is not completed by the minority firm.
 To the best of my knowledge and belief, said Certified Minority Business Enterprise is either unavailable
 for the work/service for this project, is unable to prepare a bid, or did not respond to a request for a price
 proposal and has not completed the above portion of this submittal.

 Signature of Prime Contractor Title Date

MBE STATE ATTACHMENT F

GOOD FAITH EFFORTS DOCUMENTATION TO SUPPORT WAIVER REQUEST

PAGE 1 OF 4

Prime Contractor	Project Description	Solicitation Number

PARTS 1, 2, AND 3 MUST BE INCLUDED WITH THIS CERTIFICATE ALONG WITH ALL DOCUMENTS SUPPORTING YOUR WAIVER REQUEST.

I affirm that I have reviewed Attachment F-1, Waiver Guidance. I further affirm under penalties of perjury that the contents of Parts 1, 2, and 3 of this Attachment F Good Faith Efforts Documentation Form are true to the best of my knowledge, information, and belief.

Company Name

Signature of Representative

Address

Printed Name and Title

City, State and Zip Code

Date

GOOD FAITH EFFORTS DOCUMENTATION TO SUPPORT WAIVER REQUEST

PART 1 – IDENTIFIED ITEMS OF WORK BIDDER/OFFEROR MADE AVAILABLE TO MBE FIRMS

PAGE 2 OF 4

Prime Contractor	Project Description	Solicitation Number

Identify those items of work that the bidder/offeror made available to MBE Firms. This includes, where appropriate, those items the bidder/offeror identified and determined to subdivide into economically feasible units to facilitate the MBE participation. For each item listed, show the anticipated percentage of the total contract amount. It is the bidder's/offeror's responsibility to demonstrate that sufficient work to meet the goal was made available to MBE Firms, and the total percentage of the items of work identified for MBE participation equals or exceeds the percentage MBE goal set for the procurement. Note: If the procurement includes a list of bid items identified during the goal setting process as possible items of work for performance by MBE Firms, the bidder/offeror should make all of those items of work available to MBE Firms or explain why that item was not made available. If the bidder/offeror selects additional items of work to make available to MBE Firms, those additional items should also be included below.

Identified Items of Work	Was this work listed in the procurement?	Does bidder/offeror normally self-perform this work?	Was this work made available to MBE Firms? If no, explain why?
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Please check if Additional Sheets are attached.

GOOD FAITH EFFORTS DOCUMENTATION TO SUPPORT WAIVER REQUEST

PART 2 – IDENTIFIED MBE FIRMS AND RECORD OF SOLICITATIONS

Prime Contractor	Project Description	Solicitation Number

Identify the MBE Firms solicited to provide quotes for the Identified Items of Work made available for MBE participation. Include the name of the MBE Firm solicited, items of work for which bids/quotes were solicited, date and manner of initial and follow-up solicitations, whether the MBE provided a quote, and whether the MBE is being used to meet the MBE participation goal. MBE Firms used to meet the participation goal must be included on the MBE Participation Schedule. Note: If the procurement includes a list of the MBE Firms identified during the goal setting process as potentially available to perform the items of work, the bidder/offeror should solicit all of those MBE Firms or explain why a specific MBE was not solicited. If the bidder/offeror identifies additional MBE Firms who may be available to perform Identified Items of Work, those additional MBE Firms should also be included below. Copies of all written solicitations and documentation of follow-up calls to MBE Firms must be attached to this form. This list should be accompanied by a Minority Contractor Unavailability Certificate signed by the MBE contractor or a statement from the bidder/offeror that the MBE contractor refused to sign the Minority Contractor Unavailability Certificate (see Exhibit A to MBE Attachment B). If the bidder/offeror used a Non-MBE or is self-performing the identified items of work, Part 3 must be completed.

Name of Identified MBE Firm & MBE Classification	Describe Item of Work Solicited	Initial Solicitation Date & Method	Follow-up Solicitation Date & Method	Details for Follow-up Calls	Quote Rec'd	Quote Used	Reason Quote Rejected
Firm Name: <hr/> MBE Classification (Check only if requesting waiver of MBE subgoal.) <input type="checkbox"/> African American-Owned <input type="checkbox"/> Hispanic American-Owned <input type="checkbox"/> Asian American-Owned <input type="checkbox"/> Women-Owned <input type="checkbox"/> Other MBE Classification		Date: <input type="checkbox"/> Mail <input type="checkbox"/> Facsimile <input type="checkbox"/> Email	Date: <input type="checkbox"/> Phone <input type="checkbox"/> Mail <input type="checkbox"/> Facsimile <input type="checkbox"/> Email	Time of Call: Spoke With: <input type="checkbox"/> Left Message	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Used Other MBE <input type="checkbox"/> Used Non-MBE <input type="checkbox"/> Self-performing
Firm Name: <hr/> MBE Classification (Check only if requesting waiver of MBE subgoal.) <input type="checkbox"/> African American-Owned <input type="checkbox"/> Hispanic American-Owned <input type="checkbox"/> Asian American-Owned <input type="checkbox"/> Women-Owned <input type="checkbox"/> Other MBE Classification		Date: <input type="checkbox"/> Mail <input type="checkbox"/> Facsimile <input type="checkbox"/> Email	Date: <input type="checkbox"/> Phone <input type="checkbox"/> Mail <input type="checkbox"/> Facsimile <input type="checkbox"/> Email	Time of Call: Spoke With: <input type="checkbox"/> Left Message	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Used Other MBE <input type="checkbox"/> Used Non-MBE <input type="checkbox"/> Self-performing

Please check if Additional Sheets are attached.

GOOD FAITH EFFORTS DOCUMENTATION TO SUPPORT WAIVER REQUEST

PART 3 – ADDITIONAL INFORMATION REGARDING REJECTED MBE QUOTES

PAGE 4 OF 4

Prime Contractor	Project Description	Solicitation Number

This form must be completed if Part 2 indicates that a MBE quote was rejected because the bidder/offeror is using a Non-MBE or is self-performing the Identified Items of Work. Provide the Identified Items Work, indicate whether the work will be self-performed or performed by a Non-MBE, and if applicable, state the name of the Non-MBE. Also include the names of all MBE and Non-MBE Firms that provided a quote and the amount of each quote.

Describe Identified Items of Work Not Being Performed by MBE (Include spec/section number from bid)	Self-performing or Using Non-MBE (Provide name)	Amount of Non-MBE Quote	Name of Other Firms who Provided Quotes & Whether MBE or Non-MBE	Amount Quoted	Indicate Reason Why MBE Quote Rejected & Briefly Explain
	<input type="checkbox"/> Self-performing <input type="checkbox"/> Using Non-MBE	\$ _____ —	_____ <input type="checkbox"/> MBE <input type="checkbox"/> Non-MBE	\$ _____ —	<input type="checkbox"/> Price <input type="checkbox"/> Capabilities <input type="checkbox"/> Other
	<input type="checkbox"/> Self-performing <input type="checkbox"/> Using Non-MBE	\$ _____ —	_____ <input type="checkbox"/> MBE <input type="checkbox"/> Non- MBE	\$ _____ —	<input type="checkbox"/> Price <input type="checkbox"/> Capabilities <input type="checkbox"/> Other
	<input type="checkbox"/> Self-performing <input type="checkbox"/> Using Non-MBE	\$ _____ —	_____ <input type="checkbox"/> MBE <input type="checkbox"/> Non- MBE	\$ _____ —	<input type="checkbox"/> Price <input type="checkbox"/> Capabilities <input type="checkbox"/> Other
	<input type="checkbox"/> Self-performing <input type="checkbox"/> Using Non- MBE	\$ _____ —	_____ <input type="checkbox"/> MBE <input type="checkbox"/> Non- MBE	\$ _____ —	<input type="checkbox"/> Price <input type="checkbox"/> Capabilities <input type="checkbox"/> Other
	<input type="checkbox"/> Self-performing <input type="checkbox"/> Using Non- MBE	\$ _____ —	_____ <input type="checkbox"/> MBE <input type="checkbox"/> Non- MBE	\$ _____ —	<input type="checkbox"/> Price <input type="checkbox"/> Capabilities <input type="checkbox"/> Other
	<input type="checkbox"/> Self-performing <input type="checkbox"/> Using Non- MBE	\$ _____ —	_____ <input type="checkbox"/> MBE <input type="checkbox"/> Non- MBE	\$ _____ —	<input type="checkbox"/> Price <input type="checkbox"/> Capabilities <input type="checkbox"/> Other

Please check if Additional Sheets are attached.

Attachment F

MBE WAIVER DOCUMENTATION

Project Name: _____ **PSC No.** _____

Base Contract Amount \$ _____

Plus Accepted Alternates \$ _____

Equals Total Contract Amount \$ _____

I have previously requested that a waiver be granted to the overall MBE goal for this project of ____ percent, with a minimum of ____ percent from certified African American-owned businesses, a minimum of ____ percent from certified Asian American-owned businesses, and the balance from all certified minority business enterprises, if applicable. This would include the total dollar value of all materials, supplies, equipment, and services, including construction services directly or indirectly, from Minority Business Enterprises (MBE) which are currently certified by the Maryland Department of Transportation (MDOT).

I _____, hereby certify that my position is
(Name of Company Representative)

_____, and I am the duly authorized representative of
(Position Title)

_____.
(Company Name)

I further certify that I have submitted a *Schedule for Participation of Certified Minority Business Enterprises* which reflects the percentage and dollar value of certified Minority Business Enterprise participation which my company expects to achieve for this contract. Therefore, the request for the waiver is as follows:

Summary MBE Participation Schedule from Attachment B

Minority Group	MBE GOAL		Actual MBE Participation		Request For Waiver	
	Dollar Value of Total Contract*	Percent of Total Contract	Dollar Value	Percent of Total Contract	Dollar Value	Percent of Total Contract
a. Sub Goal African American						
b. Sub Goal Asian American						
c. Other * in Sub Goal group a/b above						
TOTALS						

* with accepted/rejected alternates

To support this request for a waiver, I include the following information as attachments which I certify to be true to the best of my knowledge.

1. A detailed statement of the efforts made by the contractor to identify and select portions of the work proposed to be performed by subcontractors in order to increase the likelihood of achieving the stated goal;
2. A detailed statement of the efforts made by the contractor prior to and up to 10 days before the bid opening to solicit minority business enterprises through written notices that describe the categories of work for which subcontracting is being solicited, the type of work to be performed, and specific instructions on how to submit a bid;
3. A detailed statement of the contractor's efforts to make personal contact with MBE firms identified for Item 2. above;
4. A record of the name, address, telephone number, and dates contacted for each MBE identified under items 2. and 3. above;
5. A description of the information provided to MBE's regarding the plans, specifications and the anticipated time schedule for portions of the work to be performed;
6. Information on activities to assist minority business enterprises to fulfill bonding requirements, or to obtain a waiver of these requirements;
7. Information on activities to publicize contracting opportunities to minority business enterprises, attendance at pre-bid meetings, or other meetings scheduled by the MBE Liaison or designated representative;
8. As to each MBE that placed a subcontract quotation or offer which the apparent low bidder or successful offeror considers not to be acceptable, a detailed statement of reasons for this conclusion; and
9. A list of minority subcontractors found to be unavailable. This shall be accompanied by a Minority Subcontractor Unavailability Certificate signed by the minority business enterprise or from the apparent low bidder or successful offeror indicating that the minority business did not provide the written certification.

Signature _____ Date _____
(Company Representative Name)

Sworn and subscribed before me this _____ day.

of _____ in the year _____ Notary Public _____

Reviewed and accepted by the _____ County Board of Education MBE
Liaison.
(County Name)

Signature _____ Date _____
(County Representative Name)

MBE Request For Waiver Master Form (July 2002)

**CERTIFIED MINORITY BUSINESS ENTERPRISE PARTICIPATION
STANDARD MONTHLY CONTRACTOR'S REQUISITION FOR PAYMENT**

LEA: _____
 FACILITY NAME: _____
 SCOPE OF WORK: _____

DATE: _____
 PSC NO: _____
 REQ NO: _____

Name of MBE Sub-Contractor	MDOT Certification Number and Classification	TOTAL MBE Contract Amount	Amount to be Paid THIS Requisition	TOTAL Paid to Date	MBE has Received FINAL Payment?	If amount paid is LESS than TOTAL MBE Contract Amount, EXPLAIN VARIANCE
TOTAL:		\$ -	\$ -	\$ -		

MDOT Certification Number and Classification can be located at <http://mbe.state.mdot.state.md.us/directory/>

- MBE Classification:**
- African American = AA
 - Hispanic American = H
 - Native American = N
 - Asian American = A
 - Women = W
 - African American/Women = AAW
 - Hispanic American/Women = HW
 - Native American/Women = NW
 - Asian American/Women = AW

I certify that the figures and information presented above represent accurate and true statements, that timely payments have been and will be made to suppliers and subcontractors on this project as requisitioned payments are received, and in accordance with our contracts.

Name of Contractor Firm

Authorized Contractor Signature/Date

Contractor Federal Tax ID #

Contractor MBE Classification # (if applicable)

**CERTIFIED MINORITY BUSINESS ENTERPRISE PARTICIPATION
STANDARD MONTHLY CONTRACTOR'S REQUISITION FOR PAYMENT**

Name of LEA MBE Liaison (Printed)

Signature of LEA MBE Liaison/Date

Instructions for Completion of IAC/PSCP Form 306.4 Page 3

THIS FORM TO BE COMPLETED BY PRIME CONTRACTOR ONLY

1. **LEA** – Enter full name of LEA.
2. **Facility Name** – Enter full name of school/facility.
3. **Scope of Work** – Enter type of work being performed (i.e. New, Renovation, Roof, HVAC, ASP – Flooring, QZAB – Media Center, etc.).
4. **Date** – Date of Requisition.
5. **PSC NO** – Enter full PSC Number as assigned by PSCP.
6. **REQ NO** – Enter the number of the corresponding Requisition for Payment.
7. **Name of MBE Sub-Contractor** – Enter full name of MBE Sub-Contractor.
8. **MDOT Certification Number & Classification** – Enter the 5 digit MDOT Certification number and corresponding MDOT Classification for each MBE Sub-Contractor. MDOT Classifications and the MDOT website are listed at the bottom of this form.
9. **TOTAL MBE Contract Amount** – Enter ORIGINAL Total MBE Contract Amount as stated on MBE Attachments B and D. This amount should NOT be altered with change order amounts, changes to scope of work, etc. which may affect contract amount.
10. **Amount to be Paid This Requisition** – Enter the amount to be paid to the MBE Sub-Contractor for work applicable to this requisition.
11. **TOTAL Paid to Date** – Enter the TOTAL amount paid to date to the MBE Sub-Contractor – this amount should NOT include the amount being paid on this requisition, only the total of prior payments.
12. **MBE has Received FINAL Payment** – Enter “YES” if the MBE Sub-Contractor has been paid in full. Enter “NO” if the MBE Sub-Contractor has NOT been paid in full.
13. **If amount paid is LESS than TOTAL MBE Contract Amount, EXPLAIN VARIANCE** – Enter a brief reason for the MBE Sub-Contractor NOT being paid equal to or greater than the ORIGINAL Total MBE Contract Amount as stated on this form and MBE Attachments B & D. Additional documentation may be required to be submitted for variance explanations.
14. **Name of Contractor Firm** – Enter full name of Prime Contractor.
15. **Authorized Contractor Signature/Date** – The authorized individual employed by the Prime Contractor who filled this form out should date and sign here.
16. **Contractor Federal Tax ID #** – Enter the Federal Tax ID Number of the Prime Contractor.
17. **Contractor MBE Classification #** - Enter the MDOT MBE Classification Number if the Prime Contractor is a MDOT certified MBE Company.
18. **Name of LEA MBE Liaison** – PRINT the name of the LEA MBE Liaison (or other LEA authorized employee) responsible for VERIFYING ALL INFORMATION filled out by the Prime Contractor on this form.
19. **Signature of LEA MBE Liaison/Date** – Signature of the person VERIFYING ALL INFORMATION filled out by the Prime Contractor on this form (signature of person stated in Step #18.)

CLOSE-OUT COST SUMMARY

LEA: _____

DATE: _____

SCHOOL NAME: _____

PSC # : _____

	<u>Public School Construction</u>			<u>Local and Other</u>		
Allocation:	_____			_____		
Cash Disbursements:	_____			_____		
	Approved Contracts	Expenditures	Balance	Approved Contracts	Expenditures	Total Expenditures
Construction			\$0			.
A/E			\$0			\$0
Related Costs			\$0			\$0
Total	\$0	\$0	\$0	\$0	\$0	\$0
I hereby certify that the data shown hereon is correct and request this project be closed.						
_____ Signature of LEA Representative						
FOR STATE USE ONLY						
ADJUSTMENTS:						
Allocation:	_____			Initials		
Cash:	_____			Date		
AUDIT COMMENTS:						
				Initials		
				Date		

DRAFT AIA® Document A101™ - 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the «» day of «» in the year «Two Thousand
Twenty»

(In words, indicate day, month and year.)

BETWEEN the Owner:

(Name, legal status, address and other information)

« Prince Georges County Public Schools»
«13300 Old Marlboro Pike»
«Upper Marlboro, Maryland 20772»
«Telephone Number: (301) 952-6951»

and the Contractor:

(Name, legal status, address and other information)

«
«
»
«»

for the following Project:

(Name, location and detailed description)

«New Glenridge Area Middle School»
»
«»
«»

The Architect:

(Name, legal status, address and other information)

« Grimm & Parker »
«»

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS
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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings (which are Exhibit ?.), Specifications, Addenda issued prior to execution of this Agreement (Addendum) other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9. *Note that the Supplementary General Conditions take precedence over any conflicting terms contained elsewhere in the Contract Documents*

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

The date of this Agreement.

A date set forth in a notice to proceed issued by the Owner.

Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[**«X»**] Not later than **« »** calendar days from the date of NOTICE TO PROCEED.

[**« »**] By the following date: **« »**

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

§ 3.3.4 The Contract agrees to obtain Final Completion no later than **« »** calendar days at no additional cost or escalation cost to the Owner.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor’s performance of the Contract. The Contract Sum shall **be « » (\$ « »)**, subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
No. 1	

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price
1. Part 1 Contingency Allowance	
2.	

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
See Attachment A		

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)
\$ per day

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the «First » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the «fifth » day of the «following » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than «thirty-five » («35 ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of «five » percent (« 5 » %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction; and
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing, less retainage of «five » percent (« 5 » %);

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2007;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2007; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« Five Percent »

§ 5.1.7.1.1 The following items are not subject to retainage:

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

« »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

«Reduction in retainage may occur only when work is more than seventy-five percent (75%) complete and must include executed consent of surety (AIA Document G707A);
Reduction if granted may not exceed three percent (3%) of the contract amount in retainage; and
The Owner, if reduction in retainage is granted, shall continue to retain a minimum of three percent (3%) of the balance in contract amount.

»

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

(Insert any other conditions for release of retainage upon Substantial Completion.)

« »

§ 5.1.8 DELETED

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201-2007, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« Final payment shall be executed as provided in Article 9 of AIA Document A201-2007 after formal approval by the Board of Education of Prince George's County at one of their regularly scheduled public meetings or by a Board-sanctioned representative. »

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

« » % « »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« »
« »
« »
« »

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

Arbitration pursuant to Section 15.4 of AIA Document A201–2007

Litigation in a court of competent jurisdiction

Other *(Specify)*

« The remedy for claims will be litigation in the Circuit Court of Prince George’s County »

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.1.1 If the Contract is terminated for the Owner’s convenience in accordance with Article 14 of AIA Document A201–2007, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner’s convenience.)

« « Refer to the Supplementary General Conditions » »

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

§ 7.3 The Owner may by written notice of default to the Contractor, terminate the whole or any part of the Contract in one of the following circumstances:

- .1 If the Contractor fails to perform the services as specified or within the time and manner specified herein or any extension thereof.
- .2 If the Contractor fails to perform any of the other provisions of this Contract, or so fails to make progress as to endanger performance of this Contract in accordance with its terms, and in either of these two

circumstances does not cure such failure within a period of ten (10) days (or such longer period as the Purchasing Office may authorize in writing) after receipt of written notice from the Purchasing Office specifying such failure,

- .3 If the Contractor willfully attempts to perform the services other than specified as to quality, work processes or otherwise, without specific authorization in the form of a contract amendment.
- .4 If a determination is made by the BOARD OF EDUCATION that the obtaining of the Contract was influenced by an employee of the BOARD having received a gratuity, or promise thereof, in any way or form.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

« Will Smith, Project Management Supervisor of Capital Programs »
«13300 Old Marlboro Pike, Room 10 »
«Upper Marlboro, Maryland 20772 »
«Telephone Number: 301-952-6532 »

« , Project Manager »
«13300 Old Marlboro Pike, Room 10
Upper Marlboro, Maryland 20772»
«Telephone Number: 301-952-6770»

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

«»

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Article 10 Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Article 10, and elsewhere in the Contract Documents.

§ 8.6 Other provisions:

« § 8.6.1 Application for Payment shall be made utilizing the IAC/PSCP FORM 306.4 . Submissions must include all pages of the IAC 306.4 template.

§ 8.6.2 Submit four (4) original copies of each application for payments. All four original copies must be notarized where required

§ 8.6.3. The contractor shall perform the contract in accordance with the representations made in Attachment A - Certified Minority Business Enterprise Utilization and Fair Solicitation Affidavit and Attachment B - MBE Participation Schedule, submitted as part of the bid or proposal

§ 8.6.4 Failure to perform the contract as specified and presented in the bid or proposal submission without prior

written consent of the owner shall constitute a violation of a material term of the contract

§ 8.6.5 The contractor shall structure his/her operations for the performance of the contract to attempt to achieve the MBE goals as stated in the solicitation document.

§ 8.6.6 The contractor agrees to use his/her best efforts to carry out these requirements consistent with the efficient and effective performance of the contract.

§ 8.6.7 The contractor must ensure that all certified MBEs shall have the maximum practical opportunity to compete for additional subcontract work under the contract, even after the award of the contract.

§ 8.6.8 The contractor shall submit monthly to the school system's designated representative a report listing any unpaid invoices, over 30 days old, received from any certified MBE subcontractor, the amount of each invoice and the reason payment has not been made.

§ 8.6.9 The contractor shall include in its agreements with its certified MBE subcontractors, a requirement that those subcontractors submit monthly to the School system representative a report that identifies the prime contract and lists all payments received from the contractor in the preceding 30 days, as well as any outstanding invoices, and the amount of those invoices.

§ 8.6.10 The contractor shall cooperate in any reviews of the contractor's procedures and practices with respect to minority business enterprises, which the School system MBE Liaison, the Public School Construction Program, and/or the Governor's Office of Minority Affairs may, from time to time, conduct.

§ 8.6.11 The contractor shall maintain such records as are necessary to confirm compliance with its MBE participation obligations. These records must indicate the identity of certified minority and non-minority subcontractors employed on the contract, the type of work performed by each, and the actual dollar value of work performed. Subcontract agreements documenting the work performed by all MBE participants must be retained by the contractor and furnished to the MBE Liaison and or appropriate representative on request.

§ 8.6.12 All records concerning MBE participation must be retained by the contractor for a period of five years after final completion of the contract, and will be available for inspection by the MBE Liaison, representatives from the Public School Construction Program and/or other designated official entities

§ 8.6.13 At the option of the MBE Liaison or appropriate agency representative, upon completion of the contract and before final payment and/or release of retainage, the contractor shall submit a final report in affidavit form and under penalty of perjury, of all payments made to, or withheld from MBE subcontractors.

§ 8.6.14 If at any time after submission of a bid or proposal and before execution of a contract, the apparent successful bidder or offeror determines that a certified MBE listed on Attachment B - MBE Participation Schedule has become or will become unavailable, then the apparent successful bidder or offeror shall immediately notify the procurement officer and provide such officer with a reason(s) why the change has occurred. Any desired change in Attachment B - MBE Participation Schedule shall be approved in advance by the procurement officer and shall indicate the contractor's efforts to substitute another certified MBE subcontractor to perform the work. Desired changes occurring after the date of contract execution may occur only upon written approval by Queen Anne's County Board of Education.

§ 8.6.15 A business that presents itself as a minority business may participate in a project but the contract value may not be counted toward the MBE goal or sub goals, if applicable, until the business is certified by MDOT. If it is not certified at the time of contract award it may not be counted toward the goal or sub goals, if applicable, at that time. Only the funds paid after MDOT certification can be counted toward meeting the MBE goal or sub goals, if applicable. If a certified MBE fails to meet the standards specified in State Finance and Procurement Article.14-301, Annotated Code of Maryland, the payments made to the MBE can be recorded and counted under a contract entered into when the MBE was eligible and certified. Ineligibility of an MBE to participate in the MBE program may not be the sole cause of the termination of the MBE contractual relationship for the remainder of the term of the contract.

§ 8.6.16 Contractors are encouraged to seek additional MBE participation in their contracts during the life of the project. Any additional MBE participation from certified MBEs should be reported to the MBE liaison and should

be included in subsequent monthly requisitions for payment.

§ 8.6.17 The contractor shall complete the Standard Monthly Contractor's Requisition for Payment (IAC/PSCP Form 306.4), specifically page 3 of 16, *Minority Business Enterprise Participation*, with each requisition submitted for payment. This submittal should accurately reflect the payments to be made that month to MBEs, and the cumulative total for the period specified. Any and all MBE firms that are identified on Attachment B – MBE Participation Schedule should be included on page 3 of the first and all subsequent requisitions for payment. Any MBEs identified during the life of the project should be added as soon as the contractor engages them.

§ 8.6.18 At the completion of the project the contractor shall prepare a written summary of the final certified MBE participation in the contract as compared to the proposed participation at the time of contract award. This should include the name of each certified MBE, the amount that was anticipated to be paid at the time of contract award, the amount actually paid, and an explanation of any differences that have occurred. Special attention should be given to any situations where the final payment to any MBE was below the level of commitment at the time of contract award.

§ 8.6.19 Prince Georges County Public Schools MBE Program Coordinator is:

«Wes Owens»
«13300 Old Marlboro Pike, Room 20
Upper Marlboro, Maryland 20772»
«Telephone Number: 301-780-5830»
«Fax Number: 301-952-6700»
«Email Address: Wes.Owens@pgcps.org»

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .3 Drawings (Refer to Attached Exhibit A – Drawing Index or the solicitation documents for the list of drawings)

Number	Title	Date

- .6 Specifications (Refer to the solicitation documents, specifically the Project Manual dated April 2018 issued with PGCPs IFB #DCP18-10)

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

- .8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

[] The Sustainability Plan:

Title	Date	Pages

[] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Supplementary General Conditions			

- .9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™-2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

« »

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201-2007.

(State bonding requirements, if any and limits of liability for insurance required in Article 11 of AIA Document A201-2007.)

Type of insurance or bond	Limit of liability or bond amount (\$0.00)
Refer to Document Section 00825 of the Project Manual	Refer to Document Section 00825 of the Project Manual

ARTICLE 11 AVAILABILITY OF FUNDS

§ 11.1 This contract shall be deemed executory only to the extent of appropriations available to the BOARD for the professional service. The obligation of the BOARD on all contracts, including those which envision funding through current and successive fiscal years, shall be contingent upon actual Board appropriations for the fiscal year(s) involved.

ARTICLE 12 CRIMINAL BACKGROUND CHECK/PHOTO IDENTIFICATION BADGE

§ 12.1.1 It is the responsibility of the Contractor to make certain that its employees, agents, volunteers, and sub-contractors who have contact with students be fingerprinted and have a background check in compliance with Title 5, Subtitle 5, Part VI, of the Family Law Article of the Maryland Code.

§ 12.2. Employees Having Direct Contact with Students:

Any and all current and future employees of contractor or sub-contractor who may have direct contact with students must have a criminal background check and fingerprinting conducted by the Finger Printing Office of the Board before 14 days before beginning work. Previous background checks will not be accepted. The fee for the background check shall be paid by the contractor by check or money order at the time the fingerprinting is performed. No employee can begin work in a PGCPSS Schools until results have been received. Violation of this provision may result in Termination for Cause.

§ 12.3. Employees Do Not Have Direct Contact With Students:

Employees of Contractor/ Sub-contractor / Consultant who will be placed in a PGCPSS Schools but will not have direct contact with students must have on record a Criminal Justice Information Service (CJIS) and NCIC background checks. Copies of the background checks must be forwarded to the Contract Officer before services can commence. Every two years the Contractor shall submit copies of background checks to the Contract Officer. Should any employee be flagged during the term of this agreement, the Contractor shall contact the Contract Officer within 24 hours of notification. Violation of this provision may result in Termination for Cause.

§ 12.4. Employment of Child Sex Offenders:

The Contractor/Consultant shall at all times be compliant with the Criminal Procedure Article of Annotated Code of Maryland Section 11-722 that states that a person who enters a contract with a County Board of Education or a nonpublic school may not knowingly employ an individual to work at a school if the individual is a registered child sex offender. If a registered child sex offender is employed by the Contractor/Consultant, the Contractor/Consultant is prohibited from assigning that employee to perform management, delivery, installation, repair, construction or any other type of services on any The Board property. Violation of this provision may result in Termination for Cause.

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*

«Johanna Smarr.»
Director, Purchasing & Supply Services»
(Printed name and title)

CONTRACTOR *(Signature)*

«»
« »
(Printed name and title)

Bid Bond

CONTRACTOR:

(Name, legal status and address)

<< >>< >>
<< >>

SURETY:

(Name, legal status and principal place of business)

<< >>< >>
<< >>

OWNER:

(Name, legal status and address)

<< >>< >>
<< >>

BOND AMOUNT: \$ << >>

PROJECT:

(Name, location or address, and Project number, if any)

<< >>
<< >>
<< >>

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

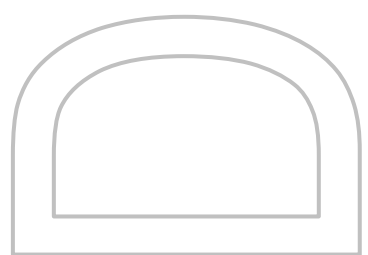
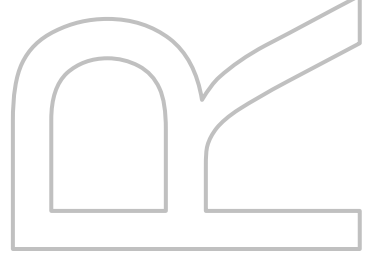
Signed and sealed this << >> day of << >>, << >>



ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.



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« »

(Witness)

« »

(Witness)

« »

(Contractor as Principal) *(Seal)*

« »

(Title)

« »

(Surety) *(Seal)*

« »

(Title)



Payment Bond

CONTRACTOR:

(Name, legal status and address)

<< >>< >>
<< >>

SURETY:

(Name, legal status and principal place of business)

<< >>< >>
<< >>

OWNER:

(Name, legal status and address)

<< >>< >>
<< >>

CONSTRUCTION CONTRACT

Date: << >>

Amount: \$ << >>

Description:
(Name and location)

<< >>
<< >>

BOND

Date:

(Not earlier than Construction Contract Date)

<< >>

Amount: \$ << >>

Modifications to this Bond: << >> None << >> See Section 18

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

Signature: << >>

SURETY

Company: (Corporate Seal)

Signature: << >>

Name and << >>< >>

Title:

(Any additional signatures appear on the last page of this Payment Bond.)

Name and << >>< >>

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

<< >>
<< >>
<< >>

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

<< >>
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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)
Signature: « »

Name and Title: « »
Address: « »

SURETY

Company: _____ (Corporate Seal)
Signature: « »

Name and Title: « »
Address: « »

DRAFT AIA® Document A312™ - 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

«TBD »« »
« »

SURETY:

(Name, legal status and principal place of business)

« »« »
« »

OWNER:

(Name, legal status and address)

«Prince Georges County Public Schools »« »
« »

CONSTRUCTION CONTRACT

Date: « »

Amount: \$ « »

Description:

(Name and location)

« »
« »

BOND

Date:

(Not earlier than Construction Contract Date)

« »

Amount: \$ « »

Modifications to this « » None « » See Section 16

Bond:

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

Signature: « »

Name and « »« »

Title:

(Any additional signatures appear on the last page of this Performance Bond.)

SURETY

Company: (Corporate Seal)

Signature: « »

Name and « »« »

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

« »
« »
« »

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

« »
« »
« »
« »
« »
« »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the

Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)
Signature: « »

Name and Title: « »
Address: « »

SURETY

Company: _____ (Corporate Seal)
Signature: « »

Name and Title: « »
Address: « »

DRAFT AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

<< >>
<< >>

THE OWNER:

(Name, legal status and address)

<< >>< >>
<< >>

THE ARCHITECT:

(Name, legal status and address)

<< >>< >>
<< >>

TABLE OF ARTICLES

- 1 GENERAL PROVISIONS
- 2 OWNER
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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document

G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and

delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon

the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term “Subcontractor” is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term “Subcontractor” does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term “Sub-subcontractor” is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor’s Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor’s Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;

- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;

- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities

proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the

procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 **Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 **Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public

authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1** Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2** An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3** Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4** The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions

of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of

Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.



SUPPLEMENTARY GENERAL CONDITIONS

These Supplementary General Conditions shall take precedence over any other term(s) in the Contract, including all of its Addenda, Attachments and any subsequent Change Orders (collectively "the Contract") dated _____ entered into between the Board of Education for Prince George's County, as Owner, and _____ as General Contractor ("Contractor"). In the event of any discrepancy or conflict between the terms of these Supplementary General Conditions and any term(s) of the Contract, the terms of these Supplementary General Conditions shall take precedence and shall govern.

1.0 DISPUTES

Any disputes between parties to the Contract which do not reach amicable settlement shall be tried exclusively in State Civil Court. The parties waive any right to trial by jury in any civil case. The Contractor shall carry on the work and maintain the Progress Schedule, during any disputes, unless otherwise directed by the Owner.

2.0 DELAYS AND EXTENSIONS OF TIME

2.1 No Damage for Delay: A time extension shall be the sole remedy for delays or suspensions or inefficiencies caused by or attributable to the Owner, even if the delays or suspensions were: (1) of a kind not contemplated by the parties, (2) amounted to an abandonment of the Contract, or (3) were caused by active interference. The Owner shall have the right, at any time and for any reason, to delay or suspend the whole or any part of the Work herein without incurring liability therefore. There shall be no damages for delay.

Contractor agrees that it shall be a material obligation for it to include the following in bold AND IN CAPITALS in every Subcontract:

No Damage for Delay: A time extension shall be the sole remedy for delays or suspensions or inefficiencies caused by or attributable to the Owner or Contractor, even if the delays or suspensions were: (1) of a kind not contemplated by the parties, (2) amounted to an abandonment of the Contract or Subcontract, or (3) were caused by active interference. The Owner shall have the right, at any time and for any reason, to delay or suspend the whole or any part of the Work herein without incurring liability therefore. There shall be no damages for delay.

2.2 The Owner shall be entitled to schedule the Work in the manner which, in its sole exercise of discretion, is in its best interest. There shall be no claims for inefficiencies, stacking of trades, lost productivity, or the like, which result from either the Owner's schedule or the manner in which the Work is performed.

2.3 If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the Owner or the Architect, or by any employee of either, or by any separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, adverse weather conditions not reasonably anticipatable, unavoidable casualties, or any causes beyond the Contractor's control, or by delay authorized by the Owner pending litigation or by any other cause which the Architect determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine. No Change Order extending the Contract Time for any such reason except for changes ordered in the Work shall result in any increased payments to the contractor for overhead, extended overhead or any other amounts of like nature.

2.4 Any claim for extension of time shall be made in writing to the Architect not more than twenty days after the commencement of the delay; otherwise, it shall be waived. In the case of a continuing delay, only one claim is necessary. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.

2.5 If necessary to reach a proper stopping place in any portion of the work or to complete work within Contract limit time, Contractor shall work overtime both his forces (including any of his subcontractors) and forces of the trade contractors without addition to the Contract Sum. Contractor shall be responsible for all incidental cost in connection with such overtime work.

2.6 If work falls behind schedule, as determined by the Architect, the Contractor shall provide at his own expense, additional labor and/or equipment, overtime pay, etc., as required to overcome delay.

2.7 The Contractor shall substantially complete the project no later than 1 June 2023, and shall achieve Final Completion no later than 1 August 2023. From payments due the Contractor, the Owner will deduct, as liquidated damages, a sum of Two Thousand dollars (\$2000.00) for each calendar day of delay beyond the above stated Completion Date unless the Contract Time has been extended by Change Order.

2.8 The Contractor shall complete the Punch List of the Work within sixty (60) consecutive calendar days from the date of issue of the Punch List at Substantial Completion. Should the work not be completed within such time, it is understood and agreed that the Owner will deduct from payments due the Contractor, as liquidated damages, not as a penalty, the sum of Two Thousand dollars (\$2000.00) for each calendar day of delay until the Punch List is completed.

3.0 INSURANCE

3.1 GENERAL INSURANCE REQUIREMENTS

3.1.1 The Contractor shall not commence Work until the Contractor has obtained at the Contractor's own expense all of the insurance as required hereunder and such insurance has been approved by the Owner; nor shall the Contractor allow any Subcontractor to commence work on any subcontract until all insurance required of the Subcontractor has been so obtained and approved by the Contractor. Approval of insurance required of the Contractor will be granted only after submission to the Owner of original certificates of insurance signed by authorized representatives of the insurers or, at the Owner's request, certified copies of the required insurance policies. Additionally, the Contractor must submit with the original certificates or certified policies, the enclosed Contractor's Insurance Checklist form completed by the Contractor and each of the Contractor's Insurance Agents or Contractor's Insurers (one form for each agent or insurer if multiple agents or insurers write the Contractor's coverages).

3.1.2 Insurance as required hereunder shall be in force throughout the term of the Contract and for two years after final acceptance of the Project by Owner in accordance with the terms of the Contract. Original certificates signed by authorized representatives of the insurers or, at the Owner's request, certified copies of insurance policies, evidencing that the required insurance is in effect, shall be maintained with the Owner throughout the term of the Contract and for two years after final acceptance of the Project by Owner.

3.1.3 The Contractor shall require its own subcontractors as well as all **trade** contractors to maintain during the term of the Contract commercial general liability insurance, business auto liability insurance, and workers compensation and employers liability insurance, and umbrella excess or excess liability insurance to the same extent required of the Contractor by the terms of the Contract unless any such requirement is expressly waived or amended by the Owner in writing. The Contractor shall furnish all subcontractors' and trade contractors' certificates of insurance to the Owner immediately upon request.

3.1.4 All insurance required hereunder shall include the following provision: *"It is agreed that this Policy is not subject to cancellation of or reduction in coverage until sixty (60) days prior written notice has been given to the Architect and the Owner."* The phrases "endeavor to" and "... but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" are to be eliminated from cancellation provisions of standard ACORD certificates of insurance.

3.1.5 The requiring of any and all insurance as set forth in these Supplementary General Conditions, or elsewhere, shall be in addition to and not in any substitution for all the other protection provided under the Contract Documents. No acceptance and/or approval of any insurance by the Owner shall be construed as relieving or excusing the

Contractor, or the Surety of his Bond, from any liability or obligation imposed upon either or both of them by the provisions of the Contract Documents.

3.1.6 The Contractor covenants to save, defend, keep harmless and indemnify the Owner and all of its elected or appointed officials, agents and employees for and against any and all claims, loss, damage, injury, cost (including court costs and attorney's fees), charge, liability or exposure, however caused, resulting from or arising out of or in any way connected with the Contractor's performance or non-performance of the terms of the Contract Documents or its obligations under the Contract. This indemnification shall continue in full force and effect until the Contractor completes all of the Work required under the Contract, except that the indemnification shall continue for all claims involving products or completed operations after final acceptance of the Work by the Owner for which the Owner gives notice to the Contractor after final acceptance of the Work. This obligation shall survive the Contract.

3.1.7 The Contractor shall be responsible for the Work performed under the Contract Documents and every part thereof, and for all materials, tools, equipment, appliances and property of any and all description used in connection with the Work. The Contractor assumes all risks for direct and indirect damage or injury to the property or persons used or employed on or in connection with the Work contracted for, and of all damage or injury to any person or property wherever located, resulting from the action, omission, commission or operation under the Contract, or in connection in any way whatsoever with the contracted Work, until final acceptance of the Work by the Owner. This obligation shall survive the Contract.

3.1.8 Insurance coverage required in the Construction Documents shall be in force throughout the contract term. Should the Contractor fail to provide acceptable evidence of current insurance within three days of written notice at any time during the contract term, the Owner shall have the absolute right to immediately terminate the Contract, without any further obligation to the Contractor, and the Contractor shall be liable to the Owner for the entire additional cost of procuring performance and the cost of performing the incomplete portion of the Contract at time of termination.

3.1.9 Contractual and other liability insurance provided under this Contract shall not contain a supervision, inspection or engineering services exclusion that would preclude the Owner from supervising or inspecting the Project as to the end result. The Contractor shall assume all on-the-job responsibilities as to the control of persons directly employed by it and of the Subcontractors and any persons employed by the Subcontractor.

3.1.10 The Contractor shall be fully responsible to the Owner for the acts and omissions of the Subcontractors and of persons employed by them as it is for acts and omissions of persons directly employed by it.

3.1.11 Precaution shall be exercised by the Contractor at all times for the protection of persons, (including employees) and property. All existing real or personal property, utilities or services to, or of, the Owner, which are not to be demolished, altered or

impaired as part of the Contractor's undertaking shall be protected against damage or interruption of service at all times by the Contractor and its Subcontractors during the term of the Contract, and the Contractor shall be held responsible for any damage to property occurring by reason of its operation on the property.

3.1.12 The Contractor shall purchase and maintain all required insurance coverages from insurers authorized to do business in the State of Maryland and acceptable to the Owner. The insurers must also have a policyholders' rating of "A-" or better, and a financial size of "Class VII" or better in the latest evaluation by A. M. Best Company, unless the Owner grants specific approval for an exception. The Owner hereby grants specific approval for the acquisition of workers compensation and employers liability insurance from the Injured Workers Insurance Fund of Maryland.

3.1.13 Any deductibles or retentions in excess of \$10,000 shall be disclosed by the Contractor, and are subject to Owner's written approval. Any deductible or retention amounts elected by the Contractor or imposed by the Contractor's insurer(s) shall be the sole responsibility of the Contractor.

3.1.14 Any and all return premiums and/or dividends for insurance or coverage directly charged to the Owner by the Contractor in connection with this Contract shall belong to and be payable to the Owner.

3.1.15 If the Owner is damaged by the failure or neglect of the Contractor to purchase and maintain insurance as described and required herein, without so notifying the Owner, then the Contractor shall bear all reasonable costs properly attributable thereto.

3.2 OWNER'S LIABILITY INSURANCE

3.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance, or solely at the Owner's option, the Owner may self-insure the Owner's liability exposures.

3.3 CONTRACTOR'S LIABILITY INSURANCE

3.3.1 The Contractor shall purchase and maintain the following insurance coverages which will insure against claims which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor (including its subcontractors) or by a trade contractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Insurance shall be written for not less than the limits specified below or required by law, whichever is greater.

3.3.1.1 Commercial general liability insurance or its equivalent for bodily injury, personal injury and property damage including loss of use, with minimum limits of
\$2,000,000 per occurrence;
\$2,000,000 personal and advertising injury;

\$2,000,000 general aggregate; and
\$2,000,000 products/completed operations aggregate.

This insurance shall include coverage for all of the following:

- .1 General aggregate limit applying on a per project basis;
- .2 Liability arising from premises and operations;
- .3 Liability arising from the actions of independent contractors;
- .4 Liability arising from products and completed operations with such coverage to be maintained for two years after completion of the Work;
- .5 Contractual liability including protection for the Contractor from bodily injury and property damage claims arising out of liability assumed under this Contract;
- .6 Personal injury liability including coverage for offenses related to employment; and
- .7 Liability arising from the explosion, collapse, or underground (XCU) hazards.

3.3.1.2 Business auto liability insurance or its equivalent with a minimum limit of \$2,000,000 per accident and including coverage for all of the following:

- .1 Liability arising out of the ownership, maintenance or use of any auto; and
- .2 Automobile contractual liability.

3.3.1.3 Workers compensation insurance, or its equivalent, with statutory benefits as required by Maryland law or the U.S. Longshoremen's and Harbor Workers' Compensation Act or other laws as required by labor union agreements, including standard "other states" coverage; employer's liability insurance, or its equivalent, with minimum limits of

- \$1,000,000 each accident for bodily injury by accident;
- \$1,000,000 each employee for bodily injury by disease; and
- \$1,000,000 policy limit for bodily injury by disease.

3.3.1.4 Total limit requirements of subparagraphs 3.3.1.1, 3.3.1.2 and 3.3.1.3 may be met by a combination of primary and umbrella excess liability coverages.

3.3.1.5 Owner (Board of Education of Prince George's County) and its elected and appointed officials, officers, consultants, agents and employees shall be named as additional insureds on the Contractor's commercial general liability insurance and umbrella excess or excess liability insurance policies with respect to liability arising out of the Contractor's products, installation, and/or services provided under this Contract. Such coverage shall extend to cover the additional insured(s) for liability arising out of the following:

1. On-going operations; and
2. Products and completed operations.

The commercial general liability policy and the umbrella excess liability or excess liability policies, if required herein, must include additional insured language, which shall afford liability coverage for the exposures listed above in 1. and 2.

3.3.1.6 Insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees under any Contractor's liability insurance or self-insurance required herein, including, but not limited to, umbrella and excess liability or excess liability policies, shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of insurance or self-insurance. (Any cross suits or cross liability exclusion shall be deleted from Contractor's liability insurance policies required herein.)

3.3.1.7 Insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees as specified herein shall be primary, and any other insurance, self-insurance, coverage or indemnity available to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees shall be excess of and non-contributory with insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees as specified herein.

3.3.2 If any liability insurance purchased by the Contractor has been issued on a "claims made" basis, the Contractor must comply with the following additional conditions:

- .1 The Contractor shall agree to provide certificates of insurance evidencing the above coverages for a period of two years after final payment for the Contract. Such certificates shall evidence a retroactive date no later than the beginning of the Work under this Contract; or
- .2 The Contractor shall purchase an extended (minimum two years) reporting period endorsement for each such "claims made" policy in force as of the date of final acceptance and evidence the purchase of this extended reporting period endorsement by means of a certificate of insurance or a copy of the endorsement itself. Such certificate or copy of the endorsement shall evidence a retroactive date no later than the beginning of the Work under this Contract.

3.4 PROPERTY INSURANCE (Builders Risk)

3.4.1 The Owner shall purchase and maintain builders risk insurance on a replacement cost basis with a limit at least equal to the initial Contract Sum. This insurance shall be maintained until final acceptance of the Project by the Owner or until no person or entity other than the Owner has an insurable interest in the covered property, whichever is earlier. This builders risk insurance shall include the interests of the Owner, Contractor (including its subcontractors), trade contractors and subcontractors in the Project.

3.4.2 Insurance shall be on an "all-risk" or equivalent policy form and shall insure against the perils of fire, extended coverage, theft, vandalism, malicious mischief, collapse and windstorm. Coverage is to apply for debris removal including demolition occasioned by a covered loss. This insurance shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such covered loss. Coverage for other perils such as flood and earthquake or for loss caused by the

enforcement of any applicable ordinance or law shall not be required unless otherwise provided in the Contract.

3.4.3 This builders risk insurance shall cover all of the following types of property:

1. All structures to be constructed, under construction, and/or already constructed;
2. All materials, equipment, machinery and supplies which are to be incorporated into the Project;
3. Temporary structures of any nature whatsoever; and
4. Underground property, including but not limited to, foundations, pump stations, pumps, pipes, drains, tanks and connections.

3.4.4 The Contractor shall be responsible for payment of the \$5,000 deductible applicable under this builders risk insurance, boiler and machinery insurance or other property insurance applicable to the Project.

3.4.5 Unless otherwise provided in the Contract Documents, this builders risk insurance shall cover materials to be incorporated into the Project which are off the site, and also such materials in transit **as long as such materials have been paid for by Owner.**

3.4.6 This builders risk insurance shall insure (or shall be amended to insure) against loss or damage caused by the boiler and machinery perils with limits and scope of coverage that are deemed by the Owner to be satisfactory. This insurance shall also include the interests of the Owner, Contractor (including its subcontractors), trade contractors and Subcontractors in the Project.

3.4.7 The Owner and Contractor waive all rights against (1) each other and the trade contractors, subcontractors, agents and employees of each other, and (2) the Architect, the Architect's Consultants and separate contractors, if any, and any of their Subcontractors, Sub-subcontractors, elected and appointed officials, officers, agents, employees, and consultants of any of them, for damages caused by fire or other perils to the extent covered by insurance obtained pursuant to this Paragraph 3.4 or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance held by the Owner as trustee. The foregoing waiver afforded the Architect, his agents and employees shall not extend to the liability imposed elsewhere in the Contract. The Owner or the Contractor, as appropriate, shall require of the Architect, separate contractors, Subcontractors and Sub-subcontractors by appropriate agreements, written where legally required for validity, similar waivers each in favor of all other parties enumerated in this Subparagraph 3.4.7. The policies shall provide such waivers of subrogation by endorsement or otherwise.

3.4.8 Any loss covered under this builders risk insurance, boiler and machinery insurance or other property insurance applicable to the Work shall be payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to any mortgagee clause. The Contractor shall pay its subcontractors and any trade contractors

their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require trade contractors to make payments to their subcontractors in similar manner.

3.4.9 The Owner, as fiduciary, shall have the right to adjust and settle a loss with the insurers.

3.4.10 Partial occupancy or use in accordance with the provisions of the Contract that pertain to partial occupancy or use shall not commence until the builders risk insurer has granted permission by endorsement or otherwise for the Owner to partially occupy or use any completed or partially completed portion of the Work at any stage of construction. The Owner and Contractor shall take reasonable steps to obtain such permission.

3.4.11 The insurance required by this Paragraph 3.4 is not intended to cover machinery, tools or equipment owned or rented by the Contractor, or its subcontractors, which are utilized in the performance of the Work but not incorporated into the permanent improvements. The Contractor and its subcontractors shall, at their own expense, purchase and maintain property insurance coverage for owned, leased or rented machinery, tools or equipment. The Contractor, and its subcontractors, hereby waive all rights against the Owner and its elected and appointed officials, officers, agents, employees and consultants for property damage to or loss of use of such machinery, tools or equipment to the extent that such property damage or loss of use is covered by the Contractor's or Subcontractor's property or equipment floater insurance or other similar property insurance maintained by the Contractor or its Subcontractors. The policies shall provide such waivers of subrogation by endorsement or otherwise.

3.5 LOSS OF USE INSURANCE

3.5.1 The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of this property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of this property, including consequential losses due to fire or other hazards however caused, to the extent covered by insurance under this Paragraph 3.5.

4.0 TERMINATION OF THE CONTRACT

4.1 TERMINATION BY THE OWNER

4.1.1 Termination for Convenience: It is agreed that the Owner may, without and default of the Contractor, terminate this Agreement for the convenience of the Owner at any time upon three (3) days notice to the Contractor, and upon such termination, the Contractor shall be paid within thirty (30) days after it shall submit to the Owner its requisition for payment, such part of the consideration to be paid hereunder to the Contractor for its Work as the reasonable cost of the Work performed on the project by the Contractor at the time of such termination bears to the reasonable cost of the whole

Work undertaken by the Contractor hereunder, plus the cost of any materials specifically purchased for the Work by the Contractor. Contractor shall not be entitled to recovery of anticipatory profits which have not been earned at the time of termination. Payment for materials shall be made only upon delivery of the materials to the site, and delivery of receipted invoices indicating payment in full therefor, and if requested by the Owner, releases of liens therefor, and such materials shall thereupon become the property of the Owner.

4.2.2 Termination by Default: The Board of Education of Prince George's County may, by written notice of default to the Contractor, terminate the whole or any part of the Contract. If, after notice of termination of this Contract under provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the default was excusable under the provisions of the Contract, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to a termination for convenience.

5.0 MINORITY BUSINESS ENTERPRISE PROCEDURES

5.1 PURPOSE

5.1.1 To achieve the result that a minimum of _____ percent of the total dollar value of all construction contracts for each project is made directly or indirectly with certified minority business enterprises when State Public School Construction Program funds are utilized.

- a. All general contractors and subcontractors, including certified MBE firms, when bidding as general or prime contractors are required to attempt to achieve the MBE subcontracting goals from certified MBE firms approved by the Maryland Department of Transportation (MDOT).

5.2 DEFINITIONS

5.2.1 Certification means the determination that a legal entity is a minority business enterprise consistent with the intent of Subtitle 3 of the State Finance and Procurement Article.

5.2.2 Certified Minority Business Enterprise means a minority business that holds a certification issued by the Maryland State Department of Transportation (MDOT).

5.2.3 Corporation, as defined by MDOT, is an artificial person or legal entity created by or under the authority of the laws of any state of the United States, the District of Columbia or a territory or commonwealth of the United States and formed for the purpose of transacting business in the widest sense of that term, including not only trade and commerce, but manufacturing, mining, banking, insurance, transportation and other forms of commercial or industry activity where the purpose of the organization is profit. For eligibility for certification, disadvantaged and/or minority individuals must own at least 51 percent of the voting stock and at least 51 percent of the aggregate of all classes of stock that have been issued by the corporation. (Note: stock held in trust is not

considered as stock held by the disadvantaged business persons when computing the business person(s) ownership.)

5.2.4 Economically/Socially and Economically Disadvantaged: The law establishes the level of personal net worth at \$1,500,000, above which an individual may not be found to be economically disadvantaged.

5.2.5 Managerial Control, as defined by MDOT, means that a disadvantaged or minority owner(s) has the demonstrable ability to make independent and unilateral business decisions needed to guide the future and destiny of a business.

Control may be demonstrated in many ways. For a minority owner to demonstrate control, the following examples are put forth, but are not intended to be all inclusive:

- a. Articles of Incorporation, Corporate Bylaws, Partnership Agreements and other agreements shall be free of restrictive language which would dilute the minority owner's control thereby preventing the minority owner from making those decisions which affect the destiny of a business; Articles of Incorporation, Corporate Bylaws, Partnership Agreements and other agreements shall be free of restrictive language which would dilute the minority owner's control thereby preventing the minority owner from making those decisions which affect the destiny of a business;
- b. The minority owner shall be able to show clearly through production of documents the areas of the disadvantaged business owner's control, such as, but not limited to:
 - (1) Authority to sign payroll checks and letters of credit;
 - (2) Authority to negotiate and sign for insurance and/or bonds;
 - (3) Authority to negotiate for banking services, such as establishing lines of credit; and
 - (4) Authority to negotiate and sign for contracts.
- c. Agreements for support services that do not lessen the minority owner's control of the company are permitted as long as the disadvantaged or minority business owner's authority to manage the company is not restricted or impaired.

5.2.6 Minority Business Enterprise (MBE) means any legal entity, except a joint venture, that is (a) organized to engage in commercial transactions, and (b) at least 51% owned and controlled by one or more individuals who are socially, and economically disadvantaged, including:

- African Americans;
- Alaskan Native;
- American Indians/Native Americans;
- Asians;
- Hispanics;
- Physically or mentally disabled individuals;
- Women; or

A non-profit entity organized to promote the interests of physically or mentally disabled individuals.

5.2.7 Minority Business Enterprise Liaison means the employee of the school system designated to administer the Board's Minority Business Enterprise Procedures for State funded public school construction projects.

5.2.8 Operational Control, as defined by MDOT, means that the disadvantaged or minority owner(s) must possess knowledge necessary to evaluate technical aspects of the business entity. The primary consideration in determining operational control and the extent to which the disadvantaged or minority owner(s) actually operates a business will rest upon the specialties of the industry of which the business is a part. The minority owner should have a working knowledge of the technical requirements needed to operate in his/her industry. Specifically, in the construction industry and especially among small (one to five person firms) contractors, it is reasonable to expect the disadvantaged or minority owner(s) to be knowledgeable of all aspects of the business. Accordingly, in order to clarify the level of operational involvement which a minority owner must have in a business for it to be considered eligible, the following examples are put forth, but are not intended to be all inclusive:

- a. The minority owner should have experience in the industry for which certification is being sought; and
- b. The minority owner should demonstrate that basic decisions pertaining to the daily operations of the business are independently made. This does not necessarily preclude the disadvantaged or minority owner(s) from seeking paid or unpaid advice and assistance. It does mean that the minority owner currently must possess the knowledge to weigh all advice given and to make an independent determination.

5.2.9 Ownership, as defined by MDOT, means that:

- a. The minority owners of the firm shall not be subject to any formal or informal restrictions which limit the customary discretion of the owner(s). There shall be no restrictions through, for example, charter requirements, by-law provisions, partnership agreements, franchise or distributor agreements, or any other agreements that prevent the minority owner(s), without the cooperation or vote of any non-minority, from making a business decision of the firm.
- b. This means that the disadvantaged or minority persons, in order to acquire their ownership interests in the firm, have made real and substantial contributions of capital, expertise, or other tangible personal assets derived from independently-owned holdings without benefit of a transfer of assets, gift or inheritance from non-minority persons. Examples of insufficient contributions include a promise to contribute capital, a note payable to the firm or its owners who are not minority persons, or the mere participation as an employee rather than as a manager. If the ownership interest held by a disadvantaged or minority person is subject to formal or informal restrictions, such as options, security interests, agreements, etc., held by a non-minority person or business entity, the options, security interests, agreements, etc., held by the non-minority person or business entity must not significantly impair the disadvantaged or minority person's ownership interest.

5.2.10 Partnership means an unincorporated association of two or more persons to carry on as co-owners of a business for profit. For a partnership to be deemed eligible for certification under the MDOT Program, the disadvantaged or minority person's interest must be at least 51 percent of the partnership capital.

5.2.11 Sole Proprietorship, as defined by MDOT, is a for profit business owned and operated by a disadvantaged or minority person in his or her individual capacity. For a sole proprietorship to be deemed eligible for certification under the DBE/MBE Program the disadvantaged or minority person must be the sole proprietor.

5.3 IMPLEMENTING PROCEDURE

5.3.1 The contractor shall perform the contract in accordance with the representations made in the Certified Minority Business Enterprise Utilization and Fair Solicitation Affidavit and the MBE Participation Schedule submitted as part of the bid proposal, and other materials submitted after the bid proposal.

5.3.2 Failure to so perform the contract, without prior written consent of the Owner, shall constitute a violation of a material term of the Contract.

5.3.3 The Contractor, including Certified Minority Business Enterprise firms, shall structure his/her operations for the performance of the Contract to attempt to achieve the purpose of this procedure.

.1 The Contractor agrees to use his/her best efforts to carry out these requirements consistent with the efficient and effective performance of the Contract.

.2 The Contractor must ensure that Minority Business Enterprises shall have the maximum practical opportunity to compete for Subcontract work under the Contract, even after the award of the Contract.

.3 The contractor shall submit monthly to the MBE Liaison or the school system's designated representative a report listing any unpaid invoices, over 30 days old, received from any certified MBE subcontractor, the amount of each invoice and the reason payment has not been made.

.4 The contractor shall included in its agreements with its certified MBE subcontractors, a requirement that those subcontractors submit monthly to the MBE Liaison or appropriate representative a report that identifies the prime contract and lists all payments received from contractor in the preceding 30 days, as well as any outstanding invoices, and the amount of those invoices.

.5 The contractor shall cooperate in any reviews of the contractor's procedures and practices with respect to minority business enterprises which the MBE Liaison and/or the Public School Construction Program may, from time to time, conduct.

.6 The contractor shall maintain such records as are necessary to confirm compliance with its MBE participation obligations. These records must indicate the identity of certified minority and non-minority subcontractors employed on the contract, the type of work performed by each, and the actual dollar value of work performed. Subcontract agreements documenting the work performed by all MBE participants must be retained by the contractor and furnished to the MBE Liaison and or appropriate representative on request.

.7 All records concerning MBE participation must be retained by the contractor for a period of five years after final completion of the contract, and will be available for inspection by the MBE Liaison, representatives from the Public School Construction Program and/or other designated official entities.

.8 At the option of the MBE Liaison or appropriate agency representative, upon completion of the contract and before final payment and/or release of retainage, submit a final report in affidavit form and under penalty of perjury, of all payments made to, or withheld from MBE subcontractors.

.9 If at any time after submission of a bid or proposal and before execution of a contract, the apparent successful bidder or offeror determines that a certified MBE listed on its MBE Participation Schedule has become or will become unavailable, then the apparent successful bidder or offeror ***shall immediately notify the MBE Liaison and provide such officer with a reason(s) why the change has occurred.*** Any desired change in the MBE Participation Schedule shall be approved in advance by the MBE Liaison and shall indicate the contractor's efforts to substitute another certified MBE subcontractor to perform the work. Desired changes occurring after the date of contract execution may occur only upon written approval by the Owner and subsequently by contract amendment.

5.3.4 A business that presents itself as a minority business may participate in a project but the contract value may not be counted toward the MBE goal until the business is certified by MDOT. Only the funds paid after MDOT certification can be counted toward meeting the MBE goal. If a certified MBE fails to meet the standards specified in State Finance and Procurement Article 14-301, Annotated Code of Maryland, the MBE is still eligible for credit towards an MBE goal under a contract entered into when the MBE was eligible and certified. Ineligibility of an MBE to participate in the MBE program may not be the sole cause of the termination of the MBE contractual relationship for the remainder of the term of the contract.

5.3.5 The contractor shall complete the Standard Monthly Contractor's Requisition for Payment (IAC/PSCP Form 306.4), specifically page 3 of 16 *Minority Business Enterprise Participation*, with each requisition submitted for payment. This submittal should accurately reflect the payments to be made that month to MBEs, and the cumulative total for the period reflected.

5.3.6 At the completion of the project the contractor shall prepare a written summary of the final certified MBE participation in the contract as compared to the proposed participation at the time of contract award. This should include the name of each certified MBE, the amount that was anticipated to be paid at the time of contract award, the amount actually paid, and an explanation of any differences which have occurred.

5.4 DOCUMENTATION REQUIRED

5.4.1 The following documentation shall be considered as part of the Contract, and shall be furnished by the Bidder with the bid proposal:

5.4.1.1 A completed Certified Minority Business Enterprise Utilization and Fair Solicitation Affidavit.

5.4.1.2 A completed MBE Participation Schedule naming each MBE who will participate in the project. This Schedule must identify the work that each MBE will perform. In this regard, unless an MBE itself has current certification from MDOT, the work which it performs, or materials which it supplies, to accomplish any Project activity shall not count as MBE participation. Furthermore unless the MBE itself is currently certified by MDOT to perform an activity, no work performed by any subcontractor or supplier of that MBE shall count as MBE participation.

5.4.2 The following documentation shall be considered as part of the Contract, and shall be furnished to the Board of Education MBE Liaison within ten (10) working days after **written** notification that the firm is the low responsive, responsible Bidder:

5.4.2.1 A completed Minority Business Enterprise Subcontractor Project Participation Statement shall be completed and signed by the prime contractor and each MBE firm listed on the MBE Participation Schedule.

5.4.2.2 The Outreach Efforts Compliance Statement shall be signed and completed by the Bidder/Offeror.

5.4.3 If the low responsive, responsible bidder is unable to achieve the overall contract goal of **25** percent, the low responsive, responsible bidder shall submit within 10 working days from **written** notification that the firm is the low responsive, responsible Bidder, a completed Minority Subcontractors Unavailability Certificate, Outreach Efforts Compliance Statement and a written Request For Waiver (pages 1 and 2) which shall include the following:

5.4.3.1 A detailed statement of the efforts made by the contractor to identify and select portions of the work proposed to be performed by subcontractors in order to increase the likelihood of achieving the stated goal;

5.4.3.2 A detailed statement of the efforts made by the contractor at least ten (10) days before the bid opening to solicit minority business enterprises through written notices that describe the categories of work for which subcontracting is being solicited, the type of work to be performed and specific instructions on how to submit a bid;

5.4.3.3 A detailed statement of the contractor's efforts to make personal contact with MBE firms identified for item (2) above;

5.4.3.4 A record of the name, address, telephone number and dates contacted for each MBE identified under items (2) and (3) above;

5.4.3.5 A description of the information provided to MBEs regarding the drawings, specifications and the anticipated time schedule for portions of the work to be performed;

5.4.3.6 Information on activities to assist minority business enterprises to fulfill bonding requirements or to obtain a waiver of these requirements;

5.4.3.7 Information on activities to publicize contracting opportunities to minority business enterprises, attendance at pre-bid meetings or other meetings scheduled by the MBE Liaison or designated representative;

5.4.3.8 As to each MBE that placed a subcontract quotation or offer which the apparent low bidder or successful offeror considers not to be acceptable, a detailed statement of reasons for this conclusion.

5.5 WAIVER

5.5.1 A waiver of an MBE contract goal may be granted by the school system only upon receipt of a Minority Subcontractors Unavailability Certificate, the Outreach Efforts Compliance Statement and a written Request for Waiver Form (pages 1 and 2) as described above.

5.5.1.1 The MBE Liaison will review and accept or reject the minority business enterprise material that is submitted, and may obtain legal advice or assistance from their attorney.

5.5.1.2 The MBE Liaison may assist the low responsive, responsible bidder in identifying certified minority businesses that could participate in the contract.

5.5.1.3 Assistance in the review of a request for a waiver (the documentation and justifications) may be requested from the Public School Construction Program.

6.0 BUY AMERICAN STEEL

6.1 Consistent with the provisions of the Maryland Annotated Code, Article 78A, Section 68 through 72, inclusive, known as the "Buy American Steel" Act of the General Assembly of Maryland, Acts of 1978.

6.2 Wherever in the Contract Documents, "Steel Products", as hereafter defined, are part of the supplies, services or construction required by Owner, for the construction, reconstruction, alteration, repair, improvement or maintenance of Public Works, the parties Bidding shall predicate their base offer solely upon "Steel Products" manufactured in the United States of America or one of its territories, continental or insular, subject to the jurisdiction of the United States in sufficient quantities to meet the requirements of this Contract, in which event the Base Bid is to contain a Certification to this effect.

6.3 Each Bidder shall further more attach to his Proposal the proposed cost of the supplies, services or construction required by Owner were foreign "Steel Products" to be used.

6.4 The Owner, in addition to all other reservations set forth in the Invitation to bid, shall at the time of the award and Contract pursuant thereto, determine whether the supplies, services or construction required is to utilize steel products or domestic or foreign origin.

6.5 In the event the award and Contract pursuant thereto is predicated upon the utilization of domestic "Steel Products", then, in addition to all other requirements mandated for performance hereafter in the project manual, and all documents issued in conjunction therewith, the person, corporation, partnership or other business unit or association to whom the award and Contract pursuant thereto is issued, shall as a further condition precedent to the obtaining of Final Payment from Owner, furnish same with a Certificate under oath that all "Steel Products" supplied, delivered or constructed were of domestic origin.

6.6 The "Buy American Steel" Act of Maryland defines "Steel Products" as any Product "rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed, or processed by a combination of two or more of such operations, from steel made in the United States by the Open hearth, basic oxygen, electric furnace, Bessemer, or other steel making processing".

7.0 PREVAILING WAGE RATES

7.1 Wages paid on this project are subject to the prevailing wage rates issued by the State of Maryland, Department of Labor, Licensing and Regulation pursuant to the authority of

the Commissioner of Labor and Industry given under State Finance and Procurement Article, Section 17-209, Annotated Code of Maryland.

7.2 The wage determination for this project is included with the Contract Documents.

7.3 State Finance and Procurement Article, Section 17-201 through 17-226 inclusive shall apply.

8.0 REGISTERED SEX OFFENDERS

8.1 In accordance with the State of Maryland's Criminal Procedure Article, Section 11-722, **A PERSON WHO ENTERS INTO A CONTRACT WITH A LOCAL BOARD OF EDUCATION MAY NOT KNOWINGLY EMPLOY AN INDIVIDUAL TO WORK AT A SCHOOL IF THE INDIVIDUAL IS A REGISTERED SEX OFFENDER.**

8.2 Therefore, individuals who are registered sex offenders are not eligible to work on any Prince George's County Public Schools' project. The Contractor (and his subcontractors and suppliers) shall check the Maryland Department of Public Safety & Correctional Services' MARYLAND SEX OFFENDER REGISTRY and search for the name of any employee to be assigned to work on this project.

8.3 This provision applies to all individuals that may be working on the School property, making deliveries or visiting the school property for business purposes.

8.4 In the event that a registered sex offender is discovered to be working on the Project, whether through employment by the Contractor, subcontractor, or equipment or material supplier, the Contractor shall immediately remove the individual from the premises and permanently terminate his work assignment.

8.5 If the Contractor is found to have violated this provision subsequent to an award by PGPCS, the Contract may be immediately terminated the Owner's sole discretion if the Contractor is unable to demonstrate he has exercised care and diligence in the past in checking the Maryland registry.

END OF SUPPLEMENTARY GENERAL CONDITIONS

SECTION 00825 – INSURANCE REQUIREMENTS

ARTICLE 11 – INSURANCE AND BONDS

Delete 11.1, 11.2, 11.3 and 11.4 (of the General Conditions) in their entirety and substitute the following:

11.1 - General Insurance Requirements

11.1.1 - The Contractor shall not commence Work until the Contractor has obtained at the Contractor's own expense all of the insurance as required hereunder and such insurance has been approved by the Owner; nor shall the Contractor allow any Subcontractor to commence work on any subcontract until all insurance required of the Subcontractor has been so obtained and approved by the Contractor. Approval of insurance required of the Contractor will be granted only after submission to the Owner of original certificates of insurance signed by authorized representatives of the insurers or, at the Owner's request, certified copies of the required insurance policies. Additionally, the Contractor must submit with the original certificates or certified policies, the enclosed Contractor's Insurance Checklist form completed by the Contractor and each of the Contractor's Insurance Agents or Contractor's Insurers (one form for each agent or insurer if multiple agents or insurers write the Contractor's coverage).

11.1.2 - Insurance as required hereunder shall be in force throughout the term of the Contract and for two years after final acceptance of the Project by Owner in accordance with 11.3.1.1.iv. Original certificates signed by authorized representatives of the insurers or, at the Owner's request, certified copies of insurance policies, evidencing that the required insurance is in effect, shall be maintained with the Owner throughout the term of the Contract and for two years after final acceptance of the Project by Owner.

11.1.3 - The Contractor shall require all Subcontractors to maintain during the term of the Contract commercial general liability insurance, business auto liability insurance, and workers compensation and employers liability insurance to the same extent required of the Contractor in

11.3.1.1, 11.3.1.2 and 11.3.1.3 unless any such requirement is expressly waived or amended by the Owner in writing. The Contractor shall furnish Subcontractors' certificates of insurance to the Owner immediately upon request.

11.1.4 - All insurance policies required hereunder shall be endorsed to provide that the policy is not subject to cancellation, non-renewal or material reduction in coverage until sixty (60) days prior written notice has been given to the Owner.

Therefore, the phrases "endeavor to" and "... but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" are to be eliminated from the cancellation provision of standard ACORD certificates of insurance.

11.1.5 - No acceptance and/or approval of any insurance by the Owner shall be construed as relieving or excusing the Contractor or the Contractor's Surety from any liability or obligation imposed upon either or both of them by the provisions of this Contract.

11.1.6 - If the Contractor does not meet the insurance requirements of this Contract, the Contractor shall forward a written request to the Owner for a waiver in writing of the insurance requirement(s) not met or approval in writing of alternate insurance coverage, self-insurance, or group self-insurance arrangements. If the Owner denies the request, the Contractor must comply with the insurance requirements as specified in this Contract.

11.1.7 - All required insurance coverage must be underwritten by insurers allowed to do business in the State of Maryland and acceptable to the Owner. The insurers must also have a policyholders' rating of "A-" or better, and a financial size of "Class VII" or better in the latest evaluation by A. M. Best Company, unless Owner grants specific approval for an exception. The Owner hereby grants specific approval for the acquisition of workers compensation and employers liability insurance from the Injured Workers Insurance Fund of Maryland.

11.1.8 - Any deductibles or retentions in excess of \$10,000 shall be disclosed by the Contractor, and are subject to Owner's written approval. Any deductible or retention amounts elected by the Contractor or imposed by the Contractor's insurer(s) shall be the sole responsibility of the Contractor.

11.1.9 - Any and all return premiums and/or dividends for insurance or coverage directly charged to the Owner by the Contractor in connection with this Contract shall belong to and be payable to the Owner.

11.1.10 - If the Owner is damaged by the failure or neglect of the Contractor to purchase and maintain insurance as described and required herein, without so notifying the Owner, then the Contractor shall bear all reasonable costs properly attributable thereto.

11.2 – Owner's Liability Insurance

11.2.1 - The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance, or solely at the Owner's option, the Owner may self-insure the Owner's liability exposures.

11.3 - Contractor's Liability Insurance

11.3.1 - The Contractor shall purchase and maintain the following insurance coverage which will insure against claims which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Insurance shall be written for not less than the limits specified below or required by law, whichever is greater.

11.3.1.1 - Commercial general liability insurance or its equivalent for bodily injury, personal injury and property damage including loss of use, with minimum limits of:

\$ 1,000,000 each occurrence;
\$ 1,000,000 personal and advertising injury;
\$ 2,000,000 general aggregate; and
\$ 2,000,000 products/completed operations aggregate.

This insurance shall include coverage for all of the following:

- i. General aggregate limit applying on a per project basis;
- ii. Liability arising from premises and operations;
- iii. Liability arising from the actions of independent contractors;
- iv. Liability arising from products and completed operations with such coverage to be maintained for two years after completion of the Work;
- v. Contractual liability including protection for the Contractor from bodily injury and property damage claims arising out of liability assumed under this Contract; and
- vi. Liability arising from the explosion, collapse, or underground (XCU) hazards.

11.3.1.2 - Business auto liability insurance or its equivalent with a minimum limit of \$1,000,000 per accident and including coverage for all of the following:

- i. Liability arising out of the ownership, maintenance or use of any auto; and
- ii. Automobile contractual liability.

11.3.1.3 - Workers compensation insurance or its equivalent with statutory benefits as required by any state or Federal law, including standard "other states" coverage; employers liability insurance or its equivalent with minimum limits of:

\$ 100,000 each accident for bodily injury by accident;
\$ 100,000 each employee for bodily injury by disease; and
\$ 500,000 policy limit for bodily injury by disease.

11.3.1.4 - Contractors pollution liability insurance or its equivalent for bodily injury, property damage, including loss of use, and cleanup costs on and off the Project site, with minimum limits of:

\$ 1,000,000 each pollution incident; and
\$ 2,000,000 annual aggregate.

11.3.1.5 - Umbrella excess liability or excess liability insurance or its equivalent with minimum limits of:

\$ 5,000,000 per occurrence;
\$ 5,000,000 aggregate for other than products/completed operations and auto liability; and
\$ 5,000,000 products/completed operations aggregate

and including all of the following coverage on the applicable schedule of underlying insurance:

- i. Commercial general liability;

- ii. Business auto liability; and
- iii. Employer's liability.

11.3.1.6 - Owner and Owner's elected and appointed officials, officers, consultants, agents and employees shall be named as additional insured on the Contractor's commercial general liability insurance and umbrella excess or excess liability insurance policies with respect to liability arising out of the Contractor's work under this Contract. Such coverage shall extend to cover the additional insured(s) for liability arising out of the following:

- i. On-going operations; and
- ii. Completed operations.

The commercial general liability policy and the umbrella excess liability or excess liability policies, if required herein, must include additional insured language, which shall afford liability coverage for the exposures listed above in i. and ii.

Special Note: Policies endorsed with the following combinations of ISO forms shall be acceptable:

- **CG 2010** entitled "Additional Insured - Owners, Lessees or Contractors – Scheduled Person or Organization" and **CG 2037** entitled "Additional Insured - Owners, Lessees or Contractors – Completed Operations";

OR

- **CG 2033** entitled "Additional Insured - Owners, Lessees or Contractors - Automatic Status When Required in Construction Agreement with You" and **CG 2037** entitled "Additional Insured - Owners, Lessees or Contractors – Completed Operations".

Both endorsements are required to afford coverage to the additional insured for both on-going operations and completed operations. Additionally, the schedules on these endorsements must properly reference the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees.

11.3.1.7 - Insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees under any Contractor's liability insurance or self-insurance required herein, including, but not limited to, umbrella and excess liability or excess liability policies, shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of insurance or self-insurance. (Any cross suits or cross liability exclusion shall be deleted from Contractor's liability insurance policies required herein.)

11.3.1.8 - Insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees as specified herein shall be primary, and any other insurance, self-insurance, coverage or indemnity available to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees shall be excess of

and non-contributory with insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees as specified herein.

11.3.2 - If any liability insurance purchased by the Contractor has been issued on a "claims made" basis, the Contractor must comply with the following additional conditions:

- i. The Contractor shall agree to provide certificates of insurance evidencing the above coverage for a period of two years after final payment for the Contract. Such certificates shall evidence a retroactive date no later than the beginning of the Work under this Contract; or
- ii. The Contractor shall purchase an extended (minimum two years) reporting period endorsement for each such "claims made" policy in force as of the date of final acceptance and evidence the purchase of this extended reporting period endorsement by means of a certificate of insurance or a copy of the endorsement itself. Such certificate or copy of the endorsement shall evidence a retroactive date no later than the beginning of the Work under this Contract.

11.4 - Builders Risk Insurance

11.4.1 - The Contractor shall purchase and maintain builders risk insurance on a replacement cost basis with a limit at least equal to the initial Contract Sum. This insurance shall be maintained until final acceptance of the Project by the Owner or until no person or entity other than the Owner has an insurable interest in the covered property, whichever is earlier. This builder's risk insurance shall include the interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Project.

11.4.2 - Insurance shall be on an "all-risk" or equivalent policy form and shall insure against the perils of fire, extended coverage, theft, vandalism, malicious mischief, collapse and windstorm. Coverage is to apply for debris removal including demolition occasioned by a covered loss. This insurance shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such covered loss. Coverage for other perils such as flood and earthquake or for loss caused by the enforcement of any applicable ordinance or law shall not be required unless otherwise provided in the Contract.

11.4.3 - This builder's risk insurance shall cover all of the following types of property:

- i. All structures to be constructed, under construction, and/or already constructed which are part of the Project;
- ii. All materials, equipment, machinery and supplies which are to be incorporated into the Project;
- iii. Temporary structures of any nature whatsoever; and
- iv. Underground property, including but not limited to, foundations, pump stations, pumps, pipes, drains, tanks and connections.

11.4.4 - The Contractor shall be responsible for payment of any deductibles applicable under this builders risk insurance, boiler and machinery insurance or other property insurance applicable to the Project.

11.4.5 - Unless otherwise provided in the Contract Documents, this builders risk insurance shall cover materials to be incorporated into the Project which are off the site, and also such materials in transit.

11.4.6 - This builders risk insurance shall insure (or shall be amended to insure) against loss or damage caused by the boiler and machinery perils with limits and scope of coverage that are deemed by the Owner to be satisfactory. This insurance shall also include the interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Project.

11.4.7 - The Owner and Contractor waive all rights against each other and against the Architect, Owner's other Contractors and own forces described in Article 6, if any, and the subcontractors, sub-subcontractors, elected and appointed officials, officers, agents, employees and consultants of any of them, for property damage to or loss of use of the Work to the extent that such property damage or loss of use is covered by this builders risk insurance, boiler and machinery insurance or other property insurance applicable to the Work. The policies shall provide such waivers of subrogation by endorsement or otherwise.

11.4.8 - Any loss covered under this builders risk insurance, boiler and machinery insurance or other property insurance applicable to the Work shall be payable to the Owner as fiduciary for the insured, as their interests may appear, subject to any mortgagee clause. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

11.4.9 - Owner, as fiduciary, shall have the power to adjust and settle a loss with insurers.

11.4.10 - Partial occupancy or use in accordance with the provisions of the Contract that pertain to partial occupancy or use shall not commence until the builders risk insurer has granted permission by endorsement or otherwise for the Owner to partially occupy or use any completed or partially completed portion of the Work at any stage of construction. The Owner and Contractor shall take reasonable steps to obtain such permission.

11.4.11 - The insurance required by this Paragraph 11.4 is not intended to cover machinery, tools or equipment owned or rented by the Contractor, or its Subcontractors, which are utilized in the performance of the Work but not incorporated into the permanent improvements. The Contractor and its Subcontractors shall, at their own expense, purchase and maintain property insurance coverage for owned, leased or rented machinery, tools or equipment. The Contractor, and its Subcontractors, hereby waive all rights against the Owner and its elected and appointed officials, officers, agents, employees and consultants for property damage to or loss of use of such machinery, tools or equipment to the extent that such property damage or loss of use is covered by the Contractor's or Subcontractor's property or equipment floater insurance or other similar property insurance maintained by the Contractor or its Subcontractors. The policies shall provide such waivers of subrogation by endorsement or otherwise.

SECTION 00900 - MATERIAL TESTS AND CONSTRUCTION INSPECTIONS

A. **OVERVIEW & GENERAL INFORMATION**

1. Prince George's County Department of Permitting, Inspections and Enforcement (DPIE) have established a Third-Party Inspection Program (TPIP) to augment the internal staff inspection and responsibility services of the agency.
2. The Prince George's County Third-Party Inspection Program (TPIP) establishes a building inspections procedure that utilizes qualified, third-party professionals in addition to the County's Quality Assurance Inspectors.
3. All permits (Building and supplemental) obtained for this project shall fall under the TPIP until such time that the final Use and Occupancy (U&O) is issued and that all permit requirements for the project are finalized. This includes, but is not limited to:
 - (a) Soils and foundation construction
 - (b) Earth retention systems
 - (c) Pre-cast and Cast -in-place concrete construction
 - (d) Masonry construction
 - (e) Wood construction
 - (f) Structural steel construction
 - (g) Insulation and finish systems
 - (h) Fire protection and life safety
 - (i) Electrical systems
 - (j) Mechanical systems
 - (k) Sprinkler systems
 - (l) Fire alarm systems
4. Unless stipulated elsewhere in the contract document, the Owner shall contract and provide the Material testing and Inspection Agency approved by the Building Code Official or their designee to perform the special inspections and materials testing as required by the International Building Code (IBC) and the County for this project.

B. **RELEVANT CODES AND STANDARDS**

The applicability of this project to any technical codes or standards referenced in these Requirements shall be determined by the provisions of the relevant codes or standards in effect at the time of contract award. These requirements shall not be modified.

C. **DEFINITIONS**

The following words and terms shall, for the purposes of this document and the County's TPIP have the meaning delineated below.

NOTE: It is possible that multiple professionals share the titles defined below, for example, the term "Structural Inspector of Record" may be shared by one person who performs the foundation inspection and a second who performs inspections on the superstructure.

Agent: A full-time, qualified employee under the direct supervision of an inspecting *Registered Design Professional* retained to conduct continuous actual or assist with onsite inspections and testing.

Architect of Record (AR): The *Registered Design Professional* retained by the Owner to design and specify architectural construction and whose signature and State of Maryland architectural seal appear on the County-approved architectural construction documents.

Certification: A statement of professional opinion by a qualified *Registered Design Professional* that indicates that the work under consideration, based upon their actual inspections, in their opinion and to the best of their knowledge meets the requirements of the County-approved construction documents and the County Code. Certifications must be signed and sealed by the qualified professional making the statement.

County-Approved Plans: *Construction Documents* approved by the county including all approved revisions.

Design Engineers of Record: The *Registered Design Professionals* whose designs are included in the County-Approved Plans (includes: Electrical Engineer of Record, Fire Protection Engineer of Record, Fire Protection Systems Designer of Record, Geotechnical Engineer of Record, Mechanical Engineer of Record, and Structural Engineer of Record).

Electrical Engineer of Record (EER): The *Registered Design Professional* retained by the Owner to design or specify electrical documents and whose seal and signature appear on any electrical documents.

Electrical Inspector of Record (EIR): The *Qualified Professional* retained by the Owner to provide third-party electrical inspections and testing services as approved by the County. The EIR cannot be an individual affiliated with the *EER*.

Fabrication and Erection or Shop Drawing Documents: Written, graphic, and pictorial documents prepared or assembled after issuance of a permit describing the design, location, and physical characteristics of building components necessary for fabrication, assembly, or erection of project elements or systems. These documents usually require a supplemental County review, permit, and/or approval.

Final Inspections Report: A signed and sealed certification document from each *Third-Party Inspector of Record* that performed inspections, which indicates that the construction, having been inspected in the qualified professional's opinion and to the best of the qualified professional's belief, complies with the *County-Approved Plans* and specifications. This includes a record of all Routine Inspection Non-Compliance Reports having been satisfied.

Fire Protection Engineer of Record (FPER): The *Registered Design Professional* retained by the Owner to design or specify building fire protection and egress documents and whose seal and signature appear on any fire protection documents.

Fire Protection Inspector of Record (FPIR): The *Qualified Professional* retained by the Owner to perform third-party building fire protection and egress inspections and testing services as approved by the County. The FPIR cannot be an individual affiliated with the *FPER* or *FPSD*.

Fire Protection Systems Designer of Record (FPSD): The *Qualified Professional* retained by the Owner to design or specify fire protection system documents and whose seal and signature appear on any fire protection system documents.

Fire Protection Systems Inspector of Record (FPSI): The *Qualified Professional* retained by the Owner to perform third-party fire protection system inspections and testing services as approved by the County. The FPSI cannot be an individual affiliated with the *FPSD* or *FPER*.

General Contractor (GC): The construction company who coordinates building construction and is retained by the Owner.

Geotechnical Engineer of Record (GER): The *Registered Design Professional* retained by the Owner to design or specify earthwork and foundations and whose seal and signature appear on any geotechnical documents.

Geotechnical Inspector of Record (GIR): The *Qualified Professional* retained by the Owner to perform third-party geotechnical inspections and testing services as approved by the County. The GIR cannot be an individual affiliated with the *GER*.

Inspection: The periodic observation of work and the performance of tests for certain building's or structure's code compliance for a system or group of assembled components to assure compliance with the County Code.

Inspection and Testing Agency: Agency or agencies retained by the Owner and approved by the Building Code Official or their designee to perform special inspections and materials testing as required by the International Building Code (IBC) and the County.

Mechanical Engineer of Record (MER): The *Registered Design Professional* retained by the Owner to design or specify mechanical documents and whose seal and signature appear on any mechanical documents.

Mechanical Inspector of Record (MIR): The *Qualified Professional* retained by the Owner to provide third-party mechanical system inspection and testing as approved by the County. The MIR cannot be an individual affiliated with the *MER*.

Non-Structural Elements: Elements of a building that are not primary or secondary structural elements such as exterior curtain walls and cladding, non-load bearing partitions and stair railings. Inspection is required to assure compliance with the applicable County Building Code.

Primary Structural System: The combination of elements that serve to support the weight of the building's structural shell, the applicable live load based upon use and occupancy, and environmental loads such as snow, wind, thermal loads and seismic loads. Items such as curtain wall members, non-load bearing walls, or exterior facades are not part of the primary structural system.

Qualified Professional: An individual practicing within their area of expertise meeting the qualifications established by the County and the requirements of the State Board of Licensed Professionals.

Quality Assurance Inspector (QAS): The individual(s) employed by the Department of Permitting, Inspections and Enforcement (DPIE), Inspections Division (ID) who oversees all third-party inspections and any projects falling within the purview of the TPIP.

TPIP Certification Form: The final, signed and sealed certification documents (includes all field specific, standard certification forms) from each *Third-Party Inspector of Record* that performed inspections, which indicate the construction elements specified for their inspection that, having been inspected and in the qualified professional's opinion and to the best of their belief, comply with the *County-Approved Plans*, County Code and specifications.

Registered Design Professional: A professional licensed in the State of Maryland and practicing within their field of expertise.

Routine Inspection Report: Written documentation of each inspection done by a Third-Party Inspector of Record or their agent.

Secondary Structural Elements: Building elements that are structurally significant for the function they serve, but are not necessary for the stability of the primary structure. Examples include: support beams above the primary roof structure which carry a chiller, elevator support rails and beams, retaining walls independent of the primary building, flagpole or light pole foundations, false work required for the erection of the primary structural system, steel stairs or railings, etc.

Structural Engineer of Record (SER): The *Registered Design Professional* retained by the Owner to design or specify structural documents and whose signature and seal appear on such documents.

Structural Inspector of Record (SIR): The *Qualified Professional* retained by the Owner to provide third-party structural inspection and testing, as approved by the Building Code Official or their designee. The SIR cannot be an individual affiliated with the *SER*.

Third-Party Inspector(s) of Record (TPIR): The qualified, third-party professional(s) retained by the Owner and named in the STPI to provide discipline specific inspections and material services as approved by the Building Code Official or their designee (includes: *EIR, FPIR, FPSI, GIR, MIR* and *SIR*).

Third-Party Inspectors of Record (TPIR): (Includes: *EIR, FPIR, FPSI, GIR, MIR, and SIR.*)

Testing Laboratory Engineer of Record:

Performs construction materials testing services to meet Third-Party Inspections or County Building Code requirements.

D. FEES AND COST

Fees and costs associated with the performance of the material testing and Third-Party Inspectors of Record (TPIR) shall be borne by the Owner. Other than the standard permit fees, no additional County permitting fees are attached to the TPIP

E. MATERIAL TESTING AND INSPECTION PRE-CONSTRUCTION MEETING REQUIREMENT

A Pre-Construction Meeting shall take place after the plans and the STPI have been reviewed by the County, but prior to the issuance of a permit.

F. PARTICIPANTS IN THE PRE-CONSTRUCTION MEETING:

The following construction team members if required by virtue of the project scope of work shall participate in the meeting, as required:

- (a) Owner's duly authorized representative
- (b) Electrical Inspector of Record (EIR)
- (c) Fire Protection Inspector of Record (FPIR)
- (d) Fire Protection Systems Inspector of Record (FPSI)
- (e) Geotechnical Inspector of Record (GIR)
- (f) Mechanical Inspector of Record (MIR)

- (g) Structural Inspector of Record (SIR)
- (h) General Contractor (GC)
- (i) County Staff – Quality Assurance Inspector (QAS)
- (j) Architect of Record (AR)
- (k) Other parties deemed appropriate by the Owner or County

G. PURPOSE OF PRE-CONSTRUCTION MEETING:

1. The purpose of the Pre-Construction Meeting is to review the inspection requirements of the project and establish communication. The Owner or Owner’s representative organizes and conducts the meeting. At a minimum, the following shall be discussed:
2. Construction Project Requirements: Construction requirements of the Prince George’s County TPIP, including construction methods, site safety, fire hazard prevention and temporary electrical installations during the construction process.
3. Responsibilities: Clarify the roles and responsibilities of each party.
4. Communication: Organize channels of communication between the County, Owner's representatives, and members of the construction and design teams. Identify who is to obtain copies of various inspections reports and certifications and the time limitation on submitting those reports to Quality Assurance Inspector (QAS).
5. Schedule of Inspections: Estimate a timeline for building construction and identify areas of concern to specific inspections

H. PROJECT SITE VISITS

1. Each Third-Party Inspector of Record must perform site visit. The site visits must be at intervals appropriate to the stage of construction or as otherwise agreed by the Owner, Design Professional, or County representative.
2. Each inspection must be documented for the QAS to become clearly familiar with the progress and quality of the work completed and to determine, in general, if the work is being performed in a manner conducive to completion in accordance with the County-Approved Plans.
3. Issuance of the building permit will follow the County's approval of the STPI and confirmation of the Pre-Construction Meeting.

I. MATERIAL TESTS AND INSPECTION SERVICES RESPONSIBILITIES:

A. GENERAL CONTRACTOR:

1. The General contractor is required under this contract to perform the following functions:
2. Attend and participate at the material testing and inspection pre-construction meeting
3. Schedule material tests and inspection service with the project designated third –party agent.
4. The Contractor must provide the agent and architect with a **twenty-four hours’** notice

5. The Contractor shall maintain a log of inspection reports and ensure that it is available to the County, Owner, and third-party agents, on site at all times. This log shall be given to the Owner upon completion of the project unless mutually agreed otherwise.
6. Retest and re-inspect corrected work. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor
7. Cooperate with Architect and material testing and inspection agent in performance of their duties.
8. Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

B. MATERIAL TEST & INSPECTION AGENT:

1. EARTHWORK (SOIL & FOUNDATION) IF AND WHERE APPLICABLE

Geotechnical Inspector of Record (GIR):

- (a) Performs specified inspections to determine materials quality and in-place density tests for compliance with the County-approved construction documents.
- (b) Gives notice to proceed to the contractor, Owner and the County's QAS that the foundation system is suitable for the erection of the superstructure. This written approval must be received prior to any superstructure construction.
- (c) Notifies QAS immediately if the Contractor is proceeding against direction.
- (d) Performs specified inspections of foundations to determine their in-place load-bearing capacity:
- (e) Piling (if required): Inspections shall include inspection of piles before, during, and after driving. Inspection reports shall contain an evaluation of the pile capacity based on driving resistance, and dynamic or static pile testing. Pile driving records shall be submitted to the County prior to placement of pile caps.
- (f) Piers (if required): Inspections shall include concrete, steel reinforcement, orientation and shape of caissons, and bearing capacity at the base of the caisson. Inspection reports shall be submitted to the County prior to the placement of grade beams.
- (g) Determines any special monitoring required for the property or adjacent neighborhood prior to the start of a phase of construction that may affect adjacent properties.
- (h) Performs inspections of shallow footings and foundations systems, including shallow foundations, foundation walls, mats, slabs, etc. Inspections of cast-in-place concrete shall include formwork, monitoring the placement of concrete, concrete reinforcement, and the dimensions, shapes and locations of footings, slabs, and foundation walls.
- (i) Performs inspections of subgrade prior to the construction of footings and slabs for compatibility of bearing materials and groundwater conditions with the geotechnical report.
- (j) Performs specified inspections of structural fill material prior to, during, and following its placement for compliance with approved structural fill specifications.
- (k) Perform inspections to determine those materials' quality and in-place density tests for compliance with the County-approved construction documents.
- (l) Submits a field compaction report for all classes of fill on the site to assure structural fills are constructed in accordance with the County-Approved Plans or documents.
- (m) Inspects and certifies that the soil bearing capacity meets or exceeds the capacity specified in the construction documents.

- (n) Submits foundation and foundation system inspection reports, laboratory reports, test data and foundation records to the Architect of Record for review, among others designated by the County and/or Owner.
- (o) Notifies the County and Owner of geotechnical modifications and changes made to help assure the structure meets the requirements of the County-approved construction documents and Prince George's County Building Code.
- (p) Monitor the construction of compacted fill in structural areas and in utility trenches.
- (q) Perform in-place density tests by the sand cone or nuclear method.
- (r) Conduct foundation inspection and bearing capacity verifications at footing bottom.
- (s) Verify proper reinforcing steel placement in footings, walls, and slabs including bar size, lap length, spacing, and clearance.
- (t) Slab subgrade inspection including verification of graded stone thickness, observation of installation of vapor barrier and verify placement of wire welded fabric.

Structural Inspector of Record (SIR):

- (a) Performs subgrade condition inspections of earth work including, but not limited to:
 1. Compaction - determines that materials' quality and in-place density tests comply with the County-approved construction documents and geotechnical report.
 2. Backfill, Drainage and Waterproofing – inspects backfill, foundation drainage systems and waterproofing during and following their placement for compliance with County-approved backfill, foundation drainage systems and waterproofing specifications.
- (b) Obtains approval from the appropriate design professionals of record and County if inspection and testing results do not meet the requirements of the approved construction documents prior to continuing work in the affected area.

2. CONCRETE

This section describes the responsibilities associated with concrete work.

General Contractor (GC):

- (a) Coordinates construction so that the building is capable of carrying structural loads.
- (b) Posts the updated concrete pour schedule on the door of the field office.

Structural Engineer of Record (SER):

- (a) Reviews and approves concrete mix designs.
- (b) Establishes criteria for removal and reshoring of formwork.

Structural Inspectors of Record (SIR):

- (a) Provides inspections of concrete formwork (erection and removal), reinforcing steel, and placement of concrete as indicated below.
- (b) Provides materials testing for concrete properties and submits test results to the Structural Engineer of Record and the County.
- (c) Prepares test cylinders in accordance with ASTM C172. Cylinders for strength tests shall be cast, stored, transported, and laboratory-cured in accordance with ASTM C31. Field-cured cylinders shall be cured as closely as possible to the location of placement of the concrete pour they represent, and

be exposed as nearly as possible to the same temperature and moisture environment, in accordance with ACI 318 and ASTM C31. Testing of cylinders shall be in accordance with ASTM C39.

- (d) Determines when concrete strengths have achieved levels specified in the approved plans and specifications that will permit the removal of formwork and/or reshoring.
- (e) The SIR shall submit a written statement indicating that the concrete strength and conditions meet or exceed project design specifications and design stripping criteria. The letter should be sent to the SER and County.
- (f) Monitor concrete construction including testing temperature, slump, mix duration, and air entrainment (when required) of the fresh concrete.
- (g) Perform laboratory tests, as required, including Proctors and compressive strength tests of concrete cylinders, mortar cubes, and grout cubes.

3. MASONRY

The purpose of this section is to describe the responsibilities associated with masonry building elements.

Structural Inspector of Record (SIR):

- (a) Performs inspections of masonry and in accordance with ACI, ASCE, and TMS criteria.
- (b) Performs inspections of bracing and its removal.
- (c) Provides testing of materials.

4. STRUCTURAL STEEL

The purpose of this section is to describe the responsibilities associated with the fabrication and erection of structural steel elements.

Structural Inspector of Record (SIR):

- (a) Provides inspections of structural members and assemblies performed at the fabricator's shop. Special inspections are not needed if the fabricator does not perform any welding, thermal cutting or heating operation as part of the fabrication.
- (b) Verifies that the fabricator complies with AISC Quality Certification Program or equivalent.
- (c) Provides inspections of structural elements, connections, welding materials, and high-strength bolts as indicated on the following table. High strength bolts and nuts shall be clearly marked with an identifiable manufacturer's mark on both the bolt head and nut. Shipments of high-strength bolts, nuts and washers, whether from manufacturer, distributor, or reseller, shall include manufacturer's current test reports for chemical composition (ASTM A751) and mechanical properties, including proof load testing (ASTM F606).
- (d) Verifies that fabricated components meet the SER's approved designs.
- (e) Notifies the SER and County if inspection and testing indicate that construction does not meet the requirements of the County-approved construction documents
- (f) Monitor structural steel erection including column plumbness, bolted connections, visual checks of all welds, and verifying welder certifications.

5. FIRE PROTECTION

The purpose of this section is to describe the responsibilities associated with fire protection. The Fire Protection Services includes the following:

A. General Fire Inspections

Construction type

Egress
Interior Finish
Emergency Lighting
Fireproofing
Firestopping
Firewalls
Patrons
Rated Floors/Ceilings
Miscellaneous, other

B. Fire Suppression Systems Inspection & Testing

Fire Pumps
Standpipe Systems
Underground Piping

C. Fire Alarm Systems

Smoke Control Systems
Detection Systems
Commercial Kitchen Exhaust Hoods

Fire Protection Inspector of Record (FPIR):

- (a) Provides inspection of spray-on fireproofing.
- (b) Assures compliance with the County-approved construction documents, Prince George's County Code, Subtitle IV of the County Ordinance, and the Maryland State Fire Code.
- (c) Submits reports of Fire Protection inspections to the Architect of Record, Owner, and Fire Code Official of PLD.
- (d) Submits a certification to the Architect of Record, Owner, and County representative stating that the structure is ready for close-in based on the inspections performed and construction observed.
- (e) Routinely monitors construction project for fire safety hazards during construction.
- (f) Assures compliance with type of construction, fire ratings of components (doors, walls, floors, roofs, etc.), height and area, egress, special occupancy provisions of plans.

Fire Protection Systems Inspector of Record (FPSI):

- (a) Performs inspections and testing of fire protection systems such as fire pumps, fire hydrants, fire standpipes, smoke control systems, emergency power systems, alarm systems, sprinkler systems, and smoke evacuation systems. Submits test results and inspection reports to the Fire Code Official for approval.

6. ELECTRICAL SYSTEMS

The purpose of this section is to describe the responsibilities associated with electrical systems.

Participating Providers

Third-Party Electrical Inspector of Record (EIR)
Approved Third-Party Inspection Agency (ATPIA)

Electrical Inspector/Inspection Agency of Record (EIR/ATPIA) Responsibilities:

- (a) Specify and perform inspections necessary during the installation of electrical systems to ensure that the systems are installed in accordance with the County-approved electrical construction documents and electrical permits issued by Prince George’s County as listed in Subtitle 9 “Electricity” of the County Code.
- (b) Submit electrical inspection reports on the approved form to ID, Electrical Code Official for Inspections and the Owner within five (5) working days. Each report shall include the building permit number, building address and the electrical permit number. Correction orders and deficiencies shall be included with each report. All reports shall bear the signature of the EIR or ATPIA providing the report.
- (c) Verify that individuals installing and erecting or repairing electrical work, including low voltage and communication systems, are in compliance with the license requirements of Subtitle 2, Division 14B, Prince George’s County Code and the Annotated Code of Maryland, Business Occupations and Professions Article, Title 6, Code of Maryland Regulations.
- (d) Verify that copies of the building permit and all electrical permits are posted on the project site in accordance with Section 9-112, Subtitle 9, “Electricity”, Prince George’s County Code.
- (e) A hard copy of the electrical permit is to be provided during the pre-construction meeting between the Owner/Owner’s representative the EIR or ATPIA and the electrical contractor.
- (f) Refer all code-related issues and interpretations to the Chief Electrical Inspector in accordance with Section 9-111, Subtitle 9, Prince George County Code.
- (g) Verify that the service is installed in accordance with the approved plans and is Code compliant for the electric utility to make a connection.
- (h) The EIR shall submit a report to the Electrical Code Official for Inspections, which will initiate a request for an ID Quality Control Inspection performed by a County commercial electrical inspector.
- (i) Once the County has approved the installation, the County Inspector will generate a “cut in certificate” to the electrical utility recorded on the County electrical permit.
- (j) Verify that all portable and temporary sources of electrical energy are permitted and are being operated in a safe and Code compliant manner.
- (k) Verifies that an electrical permit has been obtained for all electrical work on the premise.
- (l) Provides an electrical system certification to the AR, Owner, and the County Electrical Code Official for Inspection prior to close in that the electrical systems have been inspected and are ready for the structure or part of the structure to be closed-in.
- (m) Provides an electrical system certification to the AR, Owner, and the County Electrical Code Official for Inspection that specified electrical inspections have been performed and the structure is ready for the Power Company to make the service hot.

7. MECHANICAL SYSTEMS

The purpose of this section is to describe the responsibilities associated with mechanical systems.

Mechanical Inspector of Record (MIR):

- (a) Performs inspections necessary during the installation of mechanical systems to assure that the systems are installed in accordance with the County-approved mechanical construction documents and Prince George’s County Mechanical Code.
- (b) Submits inspection reports, as well as certification indicating that the mechanical systems are ready for the closing-in of the structure, to the County’s PLD.
- (c) Performs a final inspection of the system to assure that all components operate individually and as a system to meet the intent of the Code.

C. SITE INSPECTION VISITS AND REPORTS

1. The general contractor must schedule material tests and inspection service site visits for each TPIR.
2. The scheduling must be at intervals appropriate to the stage of construction or as otherwise agreed by the Owner, Design Professional, and the Building Code Official or their representative.
3. Each visit must be documented, in writing, for the QAS to become clearly familiar with the progress and quality of the work completed and to determine, in general, if the work is being performed in a manner conducive to completion in accordance with the County-Approved Plans.
4. The TPIR shall notify QAS if their services have not been requested for a project in a manner consistent with the normal construction schedule of a similar building, or if they suspect that a project is proceeding without inspections.
5. Reports shall include: the agents name, permit number, supplemental permit number(s), street address, and project name, as well as the TPIR, company, and phone number. Each report shall be prepared in a manner that is legible, describes what was inspected, and any modifications or deficiencies encountered.
6. Follow-up reports shall be prepared when deficiencies have been corrected and inspected. These reports shall clearly indicate compliance or non-compliance. Reports shall also indicate if work is proceeding without inspection approval.
7. If the Routine Inspections Report includes deficiencies, the Report shall describe the nature and specific location of the deficiency and include a description of the corrective action recommended by the Registered Design Professional of Record. If a similar deficiency exists throughout the project, it may be so noted once, but corrections must be noted individually.

D. FINAL REPORT OF THIRD-PARTY INSPECTIONS

1. Upon completion of the inspections and testing, the Third-Party Inspectors of Record (TPIR) and any Inspections and Testing Agency utilized, shall submit a Final Report of Inspection to the Owner's designee and County Quality Assurance Inspector referencing all Routine Inspection Reports issued.
2. The Final Report of Inspection is submitted after the inspection specified has been completed for the project.

E. TPIP CERTIFICATION FORM

1. Upon acceptance of the Final Report of Inspection, each Third-Party Inspector of Record (TPIR) and any Inspections and Testing Agency utilized, shall submit a TPIP Certification Form to the Building Code Official, Owner, and others as designated by the Owner.
2. The report must provide a professional opinion stating that, to the best of their knowledge, information, and belief, the work observed was constructed in accordance with the County-Approved Plans, construction documents and the Prince George's County Building Code. Submit any certification forms (NFPA, UL, FM, ASCE, etc.) with the TPIP Certification Form.

STATE OF MARYLAND
DEPARTMENT OF LABOR
DIVISION OF LABOR AND INDUSTRY
PREVAILING WAGE SECTION
1100 N. Eutaw Street, Room 607
Baltimore, MD 21201
(410) 767-2342

10/09/2020

REQUEST FOR ADVERTISEMENT AND NOTICE TO PROCEED

Pershey Drayton - Procurement Officer
P.G.C.P.S.
13300 Old Marlboro Pike
Upper Marlboro, MD 20772

Re: Glenridge Area MS (New)
Project No: 16.265.20

Enclosed please find the Prevailing Wage Determination and Instructions for Contractors for the project referenced above.

Upon advertisement for bid or proposal of this project, you are requested to submit to this office the date and name of publication in which such advertisement appeared.

Once awarded, you are further directed to submit to this office, the NOTICE TO PROCEED for the project, complete with the date of notice, the name of the general contractor, and the dollar amount of the project. In addition, we ask that a representative of the prevailing wage Unit be invited to attend the Pre-Construction Conference.

Any questions concerning this matter may be referred to PrevailingWage@dllr.state.md.us

Sincerely,

Enclosures
Wage Determination
Instruction for the Contractor

Prevailing Wage Unit

PREVAILING WAGE INSTRUCTIONS FOR THE CONTRACTOR & SUBCONTRACTOR

The contractor shall electronically submit completed copies of certified payroll records to the Commissioner of Labor & Industry, Prevailing Wage Unit by going on-line to <https://www.dllr.state.md.us/prevwage> and following the instructions for submitting payroll information (NOTE: A contractor must register prior to submitting on-line certified payroll information).

If you have technical questions regarding electronic submittal, contact the Department at dldlprevailingwage-dllr@maryland.gov.

All certified payroll records shall have an accurate week beginning and ending date. The contractor shall be responsible for certifying and submitting to the Commissioner of Labor and Industry, Prevailing Wage Unit all of their subcontractors' payroll records covering work performed directly at the work site. By certifying the payroll records, the contractor is attesting to the fact that the wage rates contained in the payroll records are not less than those established by the Commissioner as set forth in the contract, the classification set forth for each worker or apprentice conforms with the work performed, and the contractor or subcontractor has complied with the provisions of the law.

A contractor or subcontractor may make deductions that are (1) required by law; (2) required by a collective bargaining agreement between a bona fide labor organization and the contractor or subcontractor; or (3) contained in a written agreement between an employee and an employer undertaken at the beginning of employment, if the agreement is submitted by the employer to the public body awarding the public work and is approved by the public body as fair and reasonable.

A contractor or subcontractor is required to submit information on-line on their fringe benefit packages including a list of fringe benefits for each craft employed by the contractor or subcontractor, by benefit and hourly amount. Where fringe benefits are paid in cash to the employee or to an approved plan, fund, or program, the contribution is required to be indicated.

Payroll records must be electronically submitted and received within 14 calendar days after the end of each payroll period. If the contractor is delinquent in submitting payroll records, processing of partial payment estimates may be held in abeyance pending receipt of the records. In addition, if the contractor is delinquent in submitting the payroll records, the contractor shall be liable to the contracting public body for liquidated damages. The liquidated damages are \$10.00 for each calendar day the records are late.

Only apprentices registered with the Maryland Apprenticeship and Training Council shall be employed on prevailing wage projects. Apprentices shall be paid a percentage of the determined journey person's wage for the specific craft.

Overtime rates shall be paid by the contractor and any subcontractors under its contracts and agreements with their employees which in no event shall be less than time and one-half the prevailing hourly rate of wages for all hours worked in excess of ten (10) hours in any one calendar day; in excess of forty (40) hours per workweek; and work performed on Sundays and legal holidays.

Contractors and subcontractors employing a classification of worker for which a wage rate was not issued SHALL notify the Commissioner of Labor & Industry, Prevailing Wage Unit, for the purpose of obtaining the wage rate for said classification PRIOR TO BEING EMPLOYED on the project. To obtain a prevailing wage rate which was NOT listed on the Wage Determination, a contractor or subcontractor can look on the LABOR webpage under prevailing wage.

Contractors and subcontractors shall maintain a valid copy of proper State and county licenses that permit the contractor and a subcontractor to perform construction work in the State of Maryland. These licenses must be retained at the worksite and available for review upon request by the Commissioner of Labor and Industry's designee.

**Each contractor under a public work contract subject to Section 17-219 shall:

1. Post a clearly legible statement of each prevailing wage rate to be paid under the public work contract; and
2. Keep the statement posted during the full time that any employee is employed on the public work contract.
3. The statement of prevailing wage rates shall be posted in a prominent and easily accessible place at the site of the public work.

****Penalty - Subject to Section 10-1001 of the State Government Article, the Commissioner may impose on a person that violates this section a civil penalty of up to \$50.00 per violation.**

Under the Maryland Apprenticeship and Training Council requirements, consistent with proper supervision, training and continuity of employment and applicable provisions in collective bargaining agreements, a ratio of one journey person regularly employed to one apprentice shall be allowed. No deviation from this ratio shall be permitted without prior written approval from the Maryland Apprenticeship and Training Council.

Laborers may NOT assist mechanics in the performance of the mechanic's work, NOR USE TOOLS peculiar to established trades.

ALL contractors and subcontractors shall employ only competent workers and apprentices and may NOT employ any individual classified as a HELPER or TRAINEE on a prevailing wage project.

The State Apprenticeship and Training Fund (Fund) law provides that contractors and certain subcontractors performing work on certain public work contracts are required to make contributions toward apprenticeship. See §17-601 through 17-606, State Finance and Procurement, Annotated Code of Maryland. Contractors and subcontractors have three options where they can choose to make their contributions: (1) participate in a registered apprenticeship training program; (2) contribute to an organization that has a registered apprenticeship training program; or (3) contribute to the State Apprenticeship and Training Fund.

The Department of Labor (LABOR) is moving forward with final adoption of regulations. The regulations were published in the December 14, 2012 edition of the Maryland Register.

IMPORTANT: Please note that the obligations under this law will become effective on JULY1, 2013. This law will require that contractors and certain subcontractors make contributions toward apprenticeship and report those contributions on their certified payroll records that they submit pursuant to the prevailing wage law.

The Department is offering outreach seminars to any interested parties including contractors, trade associations, and any other stakeholders. Please contact the Department at dldlprevailingwage-dllr@maryland.gov or (410) 767-2968 for seminar times and locations. In addition, information regarding this law will be provided at pre-construction meetings for projects covered by the Prevailing Wage law.

**For additional information, contact:
Division of Labor and Industry
Maryland Apprenticeship and Training
1100 North Eutaw Street, Room 606
Baltimore, Maryland 21201
(410) 767-2246
E-Mail Address: matp@dllr.state.md.us.**

STATE OF MARYLAND
DEPARTMENT OF LABOR
DIVISION OF LABOR AND INDUSTRY
PREVAILING WAGE SECTION
1100 N. Eutaw Street, Room 607
Baltimore, MD 21201
(410) 767-2342

The wage rates to be paid laborers and mechanics for the locality described below is announced by order of Commissioner of Labor and Industry.

It is mandatory upon the successful bidder and any subcontractor under him, to pay not less than the specific rates to all workers employed by them in executing contracts in this locality. Reference: Annotated Code of Maryland State Finance and Procurement, Section 17-201 thru 17-226.

These wage rates were taken from the locality survey of 2019 for Prince Georges County, issued pursuant to the Commissioner's authority under State Finance and Procurement Article Section 17-209, Annotated Code of Maryland or subsequent modification.

****Note:** If additional Prevailing Wage Rates are needed for this project beyond those listed below, contact the Prevailing Wage Unit. Phone: (410) 767-2342, email: prevailingwage@dllr.state.md.us.

Name and Title of Requesting Officer: Pershey Drayton - Procurement Officer
 Department, Agency or Bureau: P.G.C.P.S.
 13300 Old Marlboro Pike Upper Marlboro, MD 20772

Project Number
16.265.20

Location and Description of work:
 Prince Georges County: Construction of new Middle School

Determination Number
45331

Date of Issue: Oct 09, 2020

BUILDING CONSTRUCTION

CLASSIFICATION	MODIFICATION REASON	BASIC HOURLY RATE	BORROWED FROM	FRINGE BENEFIT PAYMENT
BALANCING TECHNICIAN	AD	\$40.77		\$21.38
BRICKLAYER	AD	\$32.00		\$11.56
CARPENTER	AD	\$29.00		\$12.87
CARPENTER - SHORING SCAFFOLD BUILDER	AD	\$29.00		\$12.87
CARPET LAYER	AD	\$29.22		\$13.40
CEMENT MASON	AD	\$25.00	031	\$0.00
COMMUNICATION INSTALLER TECHNICIAN	AD	\$28.05	031	\$10.91
DRYWALL - SPACKLING, TAPING, & FINISHING	AD	\$25.20		\$10.42
ELECTRICIAN	AD	\$46.25		\$18.74
ELEVATOR MECHANIC	AD	\$45.53		\$37.76
FIREPROOFER - BY HAND	AD	\$19.19		\$4.69

FIREPROOFER - SPRAYER	AD	\$25.68		\$1.67
FIRESTOPPER	AD	\$28.59		\$7.53
GLAZIER	AD	\$31.26		\$12.50
INSULATION WORKER	AD	\$36.53		\$16.57
IRONWORKER - FENCE ERECTOR	AD	\$19.36		\$0.00
IRONWORKER - ORNAMENTAL	AD	\$32.50		\$22.39
IRONWORKER - REINFORCING	AD	\$27.95		\$20.16
IRONWORKER - STRUCTURAL	AD	\$32.50		\$22.39
MILLWRIGHT	AD	\$34.49		\$13.25
PAINTER	AD	\$25.20		\$10.42
PILEDRIVER	AD	\$31.89		\$11.98
PLASTERER	AD	\$29.70		\$7.48
PLASTERER - MIXER	AD	\$18.50	031	\$4.24
PLUMBER	AD	\$42.92		\$18.41
POWER EQUIPMENT OPERATOR - ASPHALT DISTRIBUTOR	AD	\$33.68	021	\$10.32
POWER EQUIPMENT OPERATOR - BACKHOE	AD	\$21.00	021	\$6.08
POWER EQUIPMENT OPERATOR - BROOM / SWEEPER	AD	\$24.32	031	\$9.43
POWER EQUIPMENT OPERATOR - BULLDOZER	AD	\$29.05		\$12.10
POWER EQUIPMENT OPERATOR - CRANE	AD	\$43.32		\$11.10
POWER EQUIPMENT OPERATOR - DRILL - RIG	AD	\$38.44		\$9.50
POWER EQUIPMENT OPERATOR - EXCAVATOR	AD	\$30.23	021	\$13.17
POWER EQUIPMENT OPERATOR - FORKLIFT	AD	\$35.00		\$7.00
POWER EQUIPMENT OPERATOR - GRADALL	AD	\$29.00		\$0.00
POWER EQUIPMENT OPERATOR - HOIST	AD	\$24.68	031	\$12.97
POWER EQUIPMENT OPERATOR - LOADER	AD	\$29.61	021	\$8.75
POWER EQUIPMENT OPERATOR - MILLING MACHINE	AD	\$17.61	031	\$5.59
POWER EQUIPMENT OPERATOR - PAVER	AD	\$17.47	031	\$6.36
POWER EQUIPMENT OPERATOR - ROLLER - ASPHALT	AD	\$21.35	031	\$5.38
POWER EQUIPMENT OPERATOR - ROLLER - EARTH	AD	\$22.80		\$0.00
POWER EQUIPMENT OPERATOR - SCRAPER	AD	\$16.50		\$0.00
POWER EQUIPMENT OPERATOR - SCREED	AD	\$17.00	031	\$0.25
POWER EQUIPMENT OPERATOR - SKID STEER (BOBCAT)	AD	\$18.05	031	\$8.78
POWER EQUIPMENT OPERATOR - SKIDDER	AD	\$28.73		\$8.65
POWER EQUIPMENT OPERATOR - TRIMMER	AD	\$36.69	021	\$0.00
POWER EQUIPMENT OPERATOR-VACCUM TRUCK	AD	\$26.00		\$3.24
RESILIENT FLOOR	AD	\$29.22		\$13.40
ROOFER/WATERPROOFER	AD	\$20.21	031	\$1.85
SHEETMETAL WORKER (INCLUDING METAL ROOFING)	AD	\$40.77		\$21.38
SPRINKLERFITTER	AD	\$29.86		\$18.99
STEAMFITTER/PIPEFITTER	AD	\$43.14		\$22.31
STONE MASON	AD	\$38.81		\$18.29
TILE & TERRAZZO FINISHER	AD	\$24.10		\$11.24
TILE & TERRAZZO MECHANIC	AD	\$29.12		\$12.27
TRUCK DRIVER - DUMP	AD	\$19.57	031	\$1.06
TRUCK DRIVER - DUMP - ARTICULATING	AD	\$23.00		\$7.32
TRUCK DRIVER - LOWBOY	AD	\$25.25	031	\$8.56

TRUCK DRIVER - TACK/TAR TRUCK	AD	\$20.00	031	\$0.25
TRUCK DRIVER - TANDEM	AD	\$27.60		\$6.98
TRUCK DRIVER - WATER	AD	\$18.50	021	\$2.61

LABORER GROUP II

LABORER - ASPHALT RAKER	AD	\$23.24		\$5.77
LABORER - COMMON	AD	\$23.24		\$5.77
LABORER - CONCRETE PUDDLER	AD	\$23.24		\$5.77
LABORER - CONCRETE TENDER	AD	\$23.24		\$5.77
LABORER - CONCRETE VIBRATOR	AD	\$23.24		\$5.77
LABORER - DENSITY GAUGE	AD	\$23.24		\$5.77
LABORER - FIREPROOFER - MIXER	AD	\$23.24		\$5.77
LABORER - FLAGGER	AD	\$23.24		\$5.77
LABORER - GRADE CHECKER	AD	\$23.24		\$5.77
LABORER - HAND ROLLER	AD	\$23.24		\$5.77
LABORER - JACKHAMMER	AD	\$23.24		\$5.77
LABORER - LANDSCAPING	AD	\$23.24		\$5.77
LABORER - LAYOUT	AD	\$23.24		\$5.77
LABORER - LUTEMAN	AD	\$23.24		\$5.77
LABORER - MORTAR MIXER	AD	\$23.24		\$5.77
LABORER - PLASTERER - HANDLER	AD	\$23.24		\$5.77
LABORER - TAMPER	AD	\$23.24		\$5.77

LABORERS GROUP I

LABORER - AIR TOOL OPERATOR	AD	\$25.05		\$8.91
LABORER - ASPHALT PAVER	AD	\$25.05		\$8.91
LABORER - BLASTER - DYNAMITE	AD	\$25.05		\$8.91
LABORER - BURNER	AD	\$25.05		\$8.91
LABORER - CONCRETE SURFACER	AD	\$25.05		\$8.91
LABORER - HAZARDOUS MATERIAL HANDLER	AD	\$25.05		\$8.91
LABORER - MASON TENDER	AD	\$25.05		\$8.91
LABORER - PIPELAYER	AD	\$25.05		\$8.91
LABORER - SCAFFOLD BUILDER	AD	\$25.05		\$8.91

Incidental Craft Data: Caulker, Man Lift Operator, Rigger, Scaffold Builder, and Welder receive the wage and fringe rates prescribed for the craft performing the operation to which welding, scaffold building, rigging, operating a Man Lift, or caulking is incidental.

These **Informational Prevailing Wage Rates** may not be substituted for the requirements of pre-advertisement or onsite job posting for a public work contract that exceeds \$500,000 in value and either of the following criteria are met: (1) the contracting body is a unit of State government or an instrumentality of the State and there is any State funding for the project; or (2) the contracting body is a political subdivision, agency, person or entity (such as a county) and the State funds 50% or more of the project.

Modification Codes:

- (AD) 17-209 Annual Determination from Survey Wage Data Received
- (CH) 17-211 Commissioners' Hearing
- (CR) 17-208 Commissioners' Review
- (SR) 17-208 Survey Review by Staff

Each "Borrowed From" county is identified with the FIPS 3-digit county code unique for the specific jurisdiction in Maryland.

For additional information on the FIPS (Federal Information Processing Standard) code, see <http://www.census.gov/datamap/fipslist/AllSt.txt>

The Prevailing Wage rates appearing on this form were originally derived from Maryland's annual Wage Survey. The Commissioner of Labor & Industry encourages all contractors and interested groups to participate in the voluntary Wage Survey, detailing wage rates paid to workers on various types of construction throughout Maryland.

A mail list of both street and email addresses is maintained by the Prevailing Wage Unit to enable up-to-date prevailing wage information, including Wage Survey notices to be sent to contractors and other interested parties. If you would like to be included in the mailing list, please forward (1) your Name, (2) the name of your company (if applicable), (3) your complete postal mailing address, (4) your email address and (5) your telephone number to PWMAILINGLIST@dlr.state.md.us. Requests for inclusion can also be mailed to: Prevailing Wage, 1100 N. Eutaw Street - Room 607, Baltimore MD 21201-2201.

SECTION 01 10 00 - SUMMARY**PART 1 GENERAL****1.1 PROJECT**

- A. Project Name: Glenridge Middle School.
- B. Owner's Name: Prince George's County Public School.
- C. The Project consists of the construction of new Glenridge Middle School and associated site work, as defined by the Contract Documents.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in the Agreement.

1.3 OWNER OCCUPANCY

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

1.4 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.

1.5 COORDINATION

- A. Web-based Project Management Software:
 - 1. RFIs, project submittals and contractor change proposals will be submitted, managed and responded to through a web-based solution for construction administration.
 - 2. The Owner and Architect have selected Newforma Project Cloud as the web-based solution for this Project. Refer to www.newformaprojectcloud.com for additional information on the service.
 - 3. Newforma will provide a training session via web conference.
 - 4. Additional PDF mark-up software may be required for electronic processing.
 - 5. The service fees to be included within Base Bid.
 - 6. Newforma Project Cloud Contact: Dan Taschereau; Tel. 603-440-3908; dtaSchereau@newforma.com.
 - 7. Provide a project record CD or DVD containing all data managed through the web-based project management software, at the conclusion of the Project.

1.6 WARRANTY

- A. The contractor shall provide a 1-year warranty for all work, materials and equipment, unless a longer warranty is required by the specific specification sections.

1.7 CONCURRENT WORK

- A. The Owner reserves the right to perform concurrent work in the area at the same time as this project. Contractor shall cooperate with Owner's contractors if required.

1.8 SPECIAL CONSIDERATIONS

- A. The following special considerations shall be carefully reviewed and considered by the contractor in preparation of their bids. No additional compensation will be allowed due to the contractor failing to properly understand and include costs associated with these items in their bid.
 - 1. There will be materials, equipment and furnishings left in the existing building. The Owner will remove anything they want prior to the start of demolition, but the Contractor shall remove and legally dispose of anything remaining in the building as part of their Base Bid.
 - 2. Site to be bid as "Unclassified" to subgrade elevations. Unclassified excavated materials may include rock, soil materials, obstructions, and other buried debris. No changes in the contract sum or contract time will be permitted for rock excavation, removal of unsuitable soils and removal of other obstructions for work down to the subgrade. When subgrade is reached, if additional work is required by the geotechnical engineer, that work will be considered as an additional service.
 - 3. Quality of the topsoil has not been tested. Contractor must test the topsoil during the bidding phase and include in their bid any costs associated with amending the topsoil in order to meet the requirements of the specifications.
 - 4. Project is required to achieve LEED Silver rating. Contractor shall carefully review and understand their roll and requirements in this process.
 - 5. This Project requires commissioning of the mechanical, plumbing and electrical systems. Refer to commissioning specification sections and commissioning plan.

1.9 CORRELATION AND INTENT OF THE CONSTRUCTION DOCUMENTS

- A. Design requirements when either drawn or specified, or both, shall prevail over the standard product of the companies specified. Any deviation from such must have the approval of the Architect and Owner.
- B. It is the responsibility of the Contractor to construct the work under this Contract so that it will be complete and finished in every detail. If mention has been omitted in the Contract Documents of any item of work or materials usually furnished or necessary for the completion or proper functioning of the project, it will be included without extra cost.
- C. All systems in all divisions are to be bid and constructed as wholly closed, connected and fully working systems. Any doubts by the Contractor as to the intent of the Contract Document requirements for such total system shall be verified before bidding.
- D. Whenever a conflict exists between drawings, drawings and specifications, or between specifications, the more stringent and costlier shall apply. Items specified but not shown on drawings must be supplied. Items shown on the drawings but not specified must be supplied. The Architect is to be notified of the conflict to determine the final precedent to follow.
- E. If there is a conflict between the General Conditions and the Specifications, the more stringent and costlier shall apply unless clarified during bidding.
- F. Where a device or piece of equipment is referred to in the singular number, such reference shall be deemed to apply to as many devices as are required to complete the installation.

1.10 ADAAG

- A. Contractor to be aware of 2010 ADA Standards for Accessible Design as indicated on the drawings and shall complete construction in compliance with these standards.

1.11 UTILITY COORDINATION

- A. Contractor bears the responsibility of being the main correspondent between the Project and all utilities inherent in the Project. The Contractor's duties shall include the following:
 - 1. Contractor is solely responsible for the coordination of all utilities inherent in the Project, both new and keeping the existing in operation. Any delay in response to the Contractor's requests and submittals by any of the project's utility companies will be considered non-compensable should the delay effect the construction critical path of the project's sequence of construction.
 - 2. Contractor is solely responsible for all bond and permit costs for all utilities required by the Project.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 21 00 - ALLOWANCES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Cash allowances.
- B. Payment and modification procedures relating to allowances.

1.2 RELATED REQUIREMENTS

- A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.3 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts, less cost of delivery to site, less applicable taxes.
- B. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.
- C. Architect Responsibilities:
 - 1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
 - 2. Select products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order.
- D. Contractor Responsibilities:
 - 1. Assist Architect in selection of products, suppliers, and installers.
 - 2. Obtain proposals from suppliers and installers and offer recommendations.
 - 3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
 - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- E. Differences in costs will be adjusted by Change Order.

1.4 CONTINGENCY ALLOWANCE

- A. Funds will be drawn from the Contingency Allowance only by the issuance of an Allowance Deduction Authorization (ADA).
- B. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.
- C. Payment for allowance items shall be made regularly by Contractor to suppliers of allowance items as work progresses. Contractor shall invoice for allowance items through periodic applications for payment as Work progresses.

1.5 ALLOWANCES SCHEDULE

- A. Contingency Allowance: Include the stipulated sum/price of \$100,000 for use upon Owner's instructions. This is the allowance amount to be included in the base bid. The stipulations are as follows.

1. This amount will be utilized for unforeseen conditions to cover extra labor and material costs, if any, and shall be tracked separately from other contract costs. All mark-up, including general conditions, overhead, profit, etc., for this allowance shall be included in the base bid. No additional or credited markup will be allowed for extra work paid for by this allowance.
- B. Section 00900 - Material Tests and Construction Inspections: Include the stipulated sum of \$60,000 for testing and inspections services.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION



ALLOWANCE DEDUCTION AUTHORIZATION (ADA)

Distribution to:

PGCPS []
ARCHITECT []
CONTRACTOR []

PROJECT:
SCHOOL NAME:
TO CONTRACTOR:

ALLOWANCE NO.:
COST PROPOSAL NO.:
INITIATION DATE:
PSCP NO:
CONTRACT FOR:
CONTRACT DATE:

Please [] add / [] deduct cost value of the following item(s) [] to / [] from this allowance for the above referenced school project.

Check one [] Signage Allowance
[] Contingency Allowance (unforseen conditions)
[] Testing Allowance

Sum of original Contract Allowances
Net change by previously authorized Allowance Deduction Authorities.....
Balance of remaining Allowances prior to this Allowance Deduction Authorization.....
Total Allowance amount requested in this authorization
Balance of remaining Allowances.....
The contract time will be [](increased) [](decreased) [](unchanged) by . () Days
The date of Substantial Completion as of the date of this authorization therefore is _____

NOT VALID UNTIL SIGNED BY THE ARCHITECT , CONTRACTOR AND OWNER.

Department of Capital Programs
Prince George's Co. Public Schools
OWNER (Firm name)
13300 Old Marlboro Pike
Upper Marlboro, Maryland 20772
ADDRESS
BY (Signature)
BY (Typed Name & Title)
DATE

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

- A. Unit price is an amount incorporated in the Contract, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, profit, and applicable taxes.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 UNIT PRICE SCHEDULE

- A. Refer to Bid Form.

END OF SECTION

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SECTION 01 23 00 - ALTERNATE BIDS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Administrative and procedural requirements for Alternate Bids.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
 2. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate. Include costs of related coordination, modification, or adjustment.

1.3 ACCEPTANCE OF ALTERNATE BIDS

- A. Alternate Bids quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternate Bids will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.4 SCHEDULE OF ALTERNATE BIDS

- A. Alternate Bid No. 1: Lightning protection system.
1. Base Bid: Do not provide lightning protection.
 2. Alternate Bid: Provide lightning protection as specified and indicated on drawings.
- B. Alternate Bid No. 2: Area Metering.
1. Base Bid: No area metering.
 2. Alternate Bid: Provide submetering (eGauge Energy Metering System) for the building with CTs at panels defined below in calculations. Provide meters at each panel and total loads per areas for final readouts and provide graphs for each accordingly.
 - a. Classroom Wing Per Floor:
 - 1) Lower Level Classroom Panels to be metered and summated: Lower Level Classrooms = Area C (MP1+LP1RP1+RP2+SB3) + Area D (MP4+LP4+RP7+RP8+SB6)
 - 2) Main Level Classroom Panels to be metered and summated: Main Level Classrooms = Area C (MP2+LP2+RP3+RP4+SB4) + Area D (MP5+LP5+RP9+RP10+SB7)
 - 3) Upper Level Classroom Panels to be metered and summated: Upper Level Classrooms = Area C (MP3+LP3+RP5+RP6+SB5) + Area D (MP6+LP6+RP11+RP12+SB8)
 - b. Kitchen:
 - 1) Kitchen = MP9+KP1+KP2+SB2 kitchen loads... SB2 kitchen loads = SB2 – (SB3+SB6+SB9+SB10)

- c. Total Building IT:
 - 1) Total Building IT = SB3+SB4+SB5+SB6+SB7+SB8+SB9+SB10
 - d. PV:
 - 1) PV = PV1
 - e. Total Building Mechanical:
 - 1) Total Building Mechanical = MP1+MP2+MP3+MP4+MP5+MP6+MP7+MP8+MP9+MP10+MP11+MP12+ circuit for OA-1+RP-9
 - f. Total Building Lighting:
 - 1) Total Building Lighting = LP1+LP2+LP3+LP4+LP5+LP6+LP7+LP8+LP9
 - g. Administration and Health Suite:
 - 1) Administration and Health Suite = MP7+RP13+RP14
 - h. Performance Arts and PE (INCLUDING STAGE AREA):
 - 1) Performance Arts and PE = RP15+RP16+RP17+RP18+RP20+circuit MDP2-37,39,41+ circuit MDP2-38,40,42+MP8+MP10+MP11+MP12+LP7+LP8+LP9
 - i. Total Building Receptacles:
 - 1) Total Building Receptacles = RP1+RP2+RP3+RP4+RP5+RP6+RP7+RP8+RP9+RP10+RP11+RP12+RP13+RP14+RP15+RP16+RP17+RP18+RP19+RP20+RP21+RP22
 - j. Overall Building:
 - 1) Total Building = MDP1 MAIN BREAKER
- C. Alternate Bid No. 3: Landscaping Tier 2.
- 1. Base Bid: Do not provide add alternate items indicated on sheets L550-L552. Provide vinyl coated fence at basketball court.
 - 2. Alternate Bid: Provide raised boardwalk and planting at the park to school walkway as indicated in the land scape drawings. Provide bus loop planting as indicated in the Landscape drawings. Provide Tier 2 level planting. Change vinyl coated fence to architectural fence at the basketball court.
- D. Alternate Bid No. 4: Irrigation for athletic fields.
- 1. Base Bid: Provide frost free yard hydrants at each field. Size all water supply piping to accommodate future irrigation systems for all athletic fields.
 - 2. Alternate Bid: Provide irrigation at the athletic fields.
- E. Alternate Bid No. 5: Entry Tile Mural.
- 1. Base Bid: Do not provide Entry Tile Mural.
 - 2. Alternate Bid: Provide Entry Tile Mural per F18, Sheet A602 and Specification Section 09 30 00 - Tiling.
- F. Alternate Bid No. 6: Sod at athletic fields.
- 1. Base Bid: Provide grass seed at athletic fields per Section 32 93 00 - Lawns and Grasses
 - 2. Alternate Bid: Provide Sod at athletic fields per Section 32 93 00 - Lawns and Grasses
- G. Alternate Bid No. 7: Additional corridor lockers.
- 1. Base Bid: Provide painted CMU and typical corridor wall base.
 - 2. Alternate Bid: Provide 308 corridor lockers with locker base and all accessories necessary for a complete installation as indicated in Areas A & B.
- H. Alternate Bid No. 8: Shade sail structures at South courtyard.
- 1. Base Bid: Do not provide Shade Sail structures indicated in South courtyard in landscape drawings.
 - 2. Alternate Bid: Provide Shade Sail Structures indicated in the South Courtyard in the landscape drawings.

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- I. Alternate Bid No. 9: Main gym bleacher bank.
 - 1. Base Bid: Provide south bleacher bank as indicated on drawings with no bleachers on the north side of the gym.
 - 2. Alternate Bid: Provide north bleacher bank for approximately 600 students as indicated.
 - J. Alternate Bid No. 10: Theatrical lighting.
 - 1. Base Bid: Do not provide theatrical rigging and lighting in the A141 Platform as indicated on the TE series drawings.
 - 2. Alternate Bid: Provide theatrical lighting package as indicated in TE series drawings.
 - K. Alternate Bid No. 11: Concrete pavers at plazas.
 - 1. Base Bid: Provide standard concrete sidewalk per civil details in lieu of concrete pavers at the areas indicated in Details A and B on Sheet L110.
 - 2. Alternate Bid: Provide concrete pavers at the areas indicated in Details A and B on Sheet L110.
 - L. Alternate Bid No. 12: Art features (exterior).
 - 1. Base Bid: Do not provide art feature.
 - 2. Alternate Bid: Provide \$40,000.00 allowance for the commissioning of site art feature to be determined.
 - M. Alternate Bid No. 13: Provide site bollard lighting as indicated.
 - 1. Base Bid: Provide site bollards as indicated on Note U27 on Sheet UE100 only.
 - 2. Alternate Bid: Provide site bollards as indicated on Sheet UE100 on Note U28.
 - N. Alternate Bid No. 14: Rooftop photovoltaic panel array.
 - 1. Base Bid: Provide PV1 panel as indicated on drawings with complete conduit/wire installation. Provide with main breaker rated for back-feed and provide 54 pole panel with all spaces for future breaker installation
 - 2. Alternate Bid: Provide low sloped, self-ballasted PV system as seen on addendum drawing. Provide breakers as required for inverters in PV1 and provide all wiring to array. Array shall be isolated on roof to dashed areas. Refer to drawings for locations of dashed areas as well as kwh production goal.
 - O. Alternate Bid No. 15: Fitness machines in P.E. Courtyard.
 - 1. Base Bid: Do not provide fitness machines in P.E. Courtyard
 - 2. Alternate Bid: Provide Fitness Machines in P.E. Courtyard as indicated in L-series drawings - L102 and A, B, C, D and E/L502.
 - P. Alternate Bid No. 16: Build out community spaces.
 - 1. Base Bid: Provide “warm shell space as indicated in the drawings” in Rooms A127, A128 and A129. Space will have shell lighting and finishes shall not be provided.
 - 2. Alternate Bid: Provide full build out as indicated in the drawings in Rooms A127, A128 and A129.
 - Q. Alternate Bid No. 17: Exterior architectural features.
 - 1. Base Bid: Do not provide additional work indicated by this Alternate Bid.
 - 2. Alternate Bid: Provide pigmentation in exterior concrete as indicated in the Landscape drawings. Provide stone veneer at exterior seating as indicated in the Landscape drawings. Provide pavers at exterior walkway as indicated in the Landscape drawings.
 - R. Alternate Bid No. 18: Special building enclosure warranty.
 - 1. Base Bid: Provide system and material warranties within individual sections related to the building enclosure.
 - 2. Alternate Bid: Provide warranty coverage for all building enclosure assemblies, from a single responsible entity, in addition to system and material warranties.

- a. Refer to Section 01 35 13, Special Project Procedures for Building Enclosure, for additional information.
- b. Special Building Enclosure Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
 - 1. MINOR CHANGES IN THE WORK
 - 2. Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.02 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue through Construction Manager a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
- B. Work Change Proposal Requests issued by Architect through Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
- C. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
- D. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
- E. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
- F. Include costs of labor and supervision directly attributable to the change.
- G. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- H. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail."
- I. Maximum Contractors markup (OH & Profit) shall be limited to as follows:
 - 1. General Contractor – In the case when the contractor self performs the work with their OWN forces, fifteen percent (15%) of the total cost of the work associated with the change order for overhead, profit, supervision, and miscellaneous expenses will be allowed.
 - 2. General Contractor – In the case when the contractor does not self-perform the work and the work is performed by a 1st – 3rd tier subcontractor, the contractor may add five percent (5%) of the total cost of the work associated with the change order for overhead, profit, supervision, and miscellaneous expenses.
 - 3. 1st Tier Subcontractor – In the case when the contractor self performs the work with their OWN forces, fifteen percent (15%) of the total cost of the work associated with the change order for overhead, profit, supervision, and miscellaneous expenses will be allowed.

4. 1st Tier Subcontractor – In the case when the contractor does not self-perform the work and the work is performed by a 2nd – 3rd tier subcontractor, the contractor may add five percent (5%) of the total cost of the work associated with the change order for overhead, profit, supervision, and miscellaneous expenses. 2nd Tier Subcontractors will be allowed to add fifteen percent (15%) for work performed by their own forces.
- J. Provide all supplier, subcontractor, manufacturer, etc backup to substantiate the proposed cost.
 1. Substantiation of Costs: Provide full information required for evaluation of each submitted Change Order.
 - a. Support each claim with the following required data:
 - i. Quantities of products, labor, and equipment.
 - ii. Taxes, insurance, and bonds.
 - iii. Overhead and profit.
 - iv. Justification for any change in Contract Time.
 - v. Credit for deletions from Contract, similarly documented.
 - vi. Supplier quotes to support the requested change.
 - vii. Subcontractor proposals with manufacturer/supplier documentation to support the requested change.
 - b. Support each claim for additional costs with additional information:
 - i. Origin and date of claim.
 - ii. Dates and times work was performed, and by whom.
 - iii. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - c. Support each claim for additional requests for time with the required data:
 - i. CPM schedule illustrating the claimed delay impact to the Critical Path.
- K. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Construction Manager.
- L. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
- M. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
- N. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
- O. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
- P. Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail."
- Q. Maximum Contractors markup (OH & Profit) shall be limited to 8% of the cost of the work associated with the change order.

- R. Provide all supplier, subcontractor, manufacturer, etc backup to substantiate the proposed cost.

1.03 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Construction Manager will issue a Change Order for signatures of Owner and Contractor on form included in Project Manual.

1.04 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue through Construction Manager a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- B. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- C. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
- D. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.05 PART 2 - PRODUCTS (NOT USED)

1.06 PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 29 00 - APPLICATION FOR PAYMENT PROCEDURES**PART 1 - GENERAL****1.1 SUMMARY**

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

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of Contract Sum or as appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
10. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Pencil copies of the payment applications are due by the 20th of the payment period. Final drafts of the payment application are due by the 1st of the payment period.
- C. Application for Payment Forms: All applications for payment are required to be submitted on the IAC/PSCP Form 306.4. The IAC/PSCP Form 306.4 can be downloaded at: <http://www.pscp.state.md.us/forms/apgindex.cfm>
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Materials previously stored and included in previous Applications for Payment.
 - b. Work completed for this Application utilizing previously stored materials.
 - c. Additional materials stored with this Application.
 - d. Total materials remaining stored, including materials with this Application.
- F. Include in Application for Payment LEED Material and Resource and Indoor Air Quality Progress Reports: Prepare the following LEED Credit template forms made available at preconstruction conference of LEED issues. Submit updated forms with each Application for Payment.
1. MR Credit 2: Construction Waste Management
 2. MR Credit 4: Recycled Content
 3. MR Credit 5: Regional Materials
 4. MR Credit 7: Certified Wood
 5. EQ Credit 4: Low-Emitting Materials
- G. Transmittal: Submit five signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).

5. Schedule of lump sum and unit price allowances.
 6. Submittal schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 3. Completed and signed LEED Credit Templates for all points falling under Contractor responsibility.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. AIA Document G707, "Consent of Surety to Final Payment."
 4. Evidence that claims have been settled.
 5. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 6. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Electronic document submittal service.
- B. Project coordination.
- C. Requests for interpretation (RFI).
- D. Subcontract list.
- E. Staff names and assignments.
- F. Preconstruction meeting.
- G. Progress meetings.
- H. Contractor's daily reports.
- I. Progress photographs.
- J. Submittals for review, information, and project closeout.
- K. Number of copies of submittals.
- L. Submittal procedures.
- M. Contractor's use of Architect's CAD files.
- N. Delegated design.
- O. Contractor's review.
- P. Architect's action.

1.2 PROJECT COORDINATOR

- A. Project Coordinator: General Contractor.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for vehicle and truck access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 50 00 - Temporary Facilities and Controls.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for Interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Closeout submittals.

1.3 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
 3. Frivolous RFIs: The Contractor will compensate the Owner for the Architect's time and expenses to process RFIs resulting from the Contractor's lack of studying and comparing the Contract Documents, coordinating their own Work, or repeating previous RFIs.
 4. Submit RFIs through the Web-based Project Management Software, in PDF format.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
1. Project name.
 2. Date.
 3. Name of Contractor.
 4. Name of Architect.
 5. RFI number, numbered sequentially.
 6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 10. Contractor's signature.
 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Format of RFIs:
1. Software-Generated RFIs:
 - a. Preferred format.
 - b. Software-generated form with substantially the same content as indicated above.
 - c. Photographs shall be electronic files in JPG format.
 - d. Attachments shall be electronic files in Adobe Acrobat PDF format.
 2. Hard-Copy RFIs:
 - a. Permitted under conditions where electronic RFI is not feasible.
 - b. Identify each page of attachments with the RFI number and sequential page number.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond through the Web-based Project Management Software. Allow ten working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs may be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.

- e. Requests for interpretation of Architect's actions on submittals.
- f. Incomplete RFIs or RFIs with numerous errors.
2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
3. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, submit Change Order Request within 10 days of receipt of the RFI response as provided by General Conditions of the Contract. Contractor waives any right to make a claim by not initiating action within this 10-day duration of time.
- E. On receipt of Architect's action, immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- F. RFI Log: Prepared and maintained by the Architect within the Web-based Project Management Software; Contractor to maintain a separate RFI log with subcontractors.

1.4 SUBCONTRACT LIST

- A. Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
 4. Number of Copies: Submit four copies of subcontractor list, unless otherwise indicated. Architect will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.

1.5 STAFF NAMES AND ASSIGNMENTS

- A. Submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site, prior to or coinciding with initial Application for Payment.
- B. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers.
- C. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
- D. Post copies of list in Project meeting room, in temporary field office, and by each temporary phone.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction

- punchlist, and any other document any participant wishes to make part of the project record.
2. Contractor and Architect are required to use this service.
 3. It is Contractor's responsibility to submit documents in allowable format to the service.
 4. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.
- C. Submittal Service - The selected service is:
1. Newforma ConstructEx: www.newformaprojectcloud.com/#sle.
 - a. Newforma Contact: Dan Taschereau; Tel. 603-440-3908; dtaschereau@newforma.com.
- D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- E. Project Closeout: Architect will determine when to terminate the service for the project, Contractor shall obtain an archive copy of the project files from the service for the Architect and Owner.

3.2 PRECONSTRUCTION MEETING

- A. Construction Manager will schedule a meeting after Notice of Award.
- B. Attendance Required:
1. Owner.
 2. Architect.
 3. Contractor.
 4. Construction Manager.
- C. Agenda:
1. Designation of personnel representing the parties to Contract, Owner, Construction Manager and Architect.
 2. Project dates.
 3. Administrative and submittal milestones.
 4. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 5. Scheduling.
 6. Architect's CAD sharing.
 7. LEED project requirements.
 8. Testing and laboratory services; Special Inspections.
 9. Temporary facilities and controls.
 10. Use of site.

- D. Construction Manager to record minutes and post to web based project management software within two days after meeting.

3.3 PROGRESS MEETINGS

- A. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required: Contractor's project manager and job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.
- C. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Review requests of trade contractors to receive Architect's and Architect's Consultants' drawing files and confirm receipt of required release forms.
 - 8. Review of off-site fabrication and delivery schedules.
 - 9. Maintenance of progress schedule.
 - 10. Corrective measures to regain projected schedules.
 - 11. Planned progress during succeeding work period.
 - 12. Coordination of projected progress.
 - 13. Maintenance of quality and work standards.
 - 14. Effect of proposed changes on progress schedule and coordination.
 - 15. LEED requirements and documentation progress.
 - 16. Other business relating to work.
- D. Architect to record minutes and post to web based project management software within five days after meeting.

3.4 DAILY CONSTRUCTION REPORTS

- A. Submit electronically via Electronic Document Submittal Service at a weekly interval.
- B. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
 - 1. Date.
 - 2. High and low temperatures, and general weather conditions.
 - 3. List of subcontractors at Project site.
 - 4. Approximate count of personnel at Project site for each trade.
 - 5. List of construction activities performed (fore each trade).
 - 6. Major equipment at Project site.
 - 7. Safety, environmental, or industrial relations incidents.
 - 8. Meetings and significant decisions.
 - 9. Accidents and unusual events (submit a separate special report).
 - 10. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
 - 11. Meter readings and similar recordings.

12. Emergency procedures.
13. Directives and requests of Authority(s) Having Jurisdiction (AHJ).
14. Change Orders received and implemented.
15. Testing and/or inspections performed.
16. Services connected or disconnected.
17. Equipment or systems tests and start-ups.
18. Partial completions, occupancies.
19. Signature of Contractor's authorized representative.

3.5 PROGRESS PHOTOGRAPHS

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of Work produced by a photographer, acceptable to Architect.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
 1. Excavations in progress.
 2. Foundations in progress and upon completion.
 3. Structural framing in progress and upon completion.
 4. Enclosure of building, upon completion.
 5. Final completion, minimum of ten (10) photos.
- E. Views:
 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
 2. Consult with Architect for instructions on views required.
 3. Provide factual presentation.
 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- F. Digital Photographs: 24 bit color, minimum resolution of 1600 by 1200 ("2 megapixel"), in JPG format; provide files unaltered by photo editing software.
 1. Delivery Medium: Web-based Project Management Software.
 2. File Naming: Include project identification, date and time of view, and view identification.
 3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
 4. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.
- G. Additional Photographic Requirements: Refer to Section 01 57 21 for photographic documentation requirements for Indoor Air Quality Controls.

3.6 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
 5. LEED submittals and reports.
- B. Package these submittals by specification section, except closeout submittals or Work performed by separate trades, in a single delivery to the Architect; failure of the Contractor to

package these submittals in a single delivery may cause the Architect to withhold action on submittal until associated submittals required by the particular specification section are received.

1. LEED Submittal and LEED Report data required by the Contract Documents and the LEED Certification process to be assembled separately from other submittal types and organized as the first items in any package of submittals; do not rely on the Architect or LEED consultant discovering the required data within product data or any other sort of submittal.
- C. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.
- D. Product data and shop drawings to be submitted and managed through the Web-based Project Management Software.
- E. Samples will be reviewed for aesthetic, color, or finish selection.
- F. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - CLOSEOUT SUBMITTALS.

3.7 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Design data.
 2. Certificates.
 3. Test reports.
 4. Inspection reports.
 5. Manufacturer's instructions.
 6. Manufacturer's field reports.
 7. Daily construction reports.
 8. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.
- C. Informational submittals to be submitted and managed through the Web-based Project Management Software.

3.8 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.9 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

- B. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.10 SUBMITTAL PROCEDURES

- A. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- B. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 21 days for initial review of each submittal; duration of time is defined by date received in Architect's office until the day sent from the Architect's office. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow 21 days for review of each resubmittal; duration of time is defined by date received in Architect's office until the day sent from the Architect's office.
 - 4. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal; duration of time is defined by date received in consultant's office until the day sent to the Contractor. Submittals required within the following divisions to be sent directly to the Architect's consultants:
 - a. All required submittals indicated in Division 3 section.
 - b. The following required submittals indicated in Division 4:
 - 1) Product data, shop drawings, material certificates, mix designs, and cold-weather procedures.
 - c. All required submittals indicated in the following Division 5 Sections:
 - 1) Structural Steel
 - 2) Steel Joists
 - 3) Steel Decking
 - 4) Cold-Formed Metal Framing
 - 5) Metal Stairs
 - 6) Railings and Handrails
 - 7) Metal Fabrications
 - d. All required submittals indicated in the following Division 8 Section:
 - 1) Door Hardware
 - 2) Curtainwall
 - e. All required submittals for Food Service Equipment.
 - f. All required submittals indicated in Mechanical Divisions 21 through 23 sections.
 - g. All required submittals indicated in Division 26 sections.
 - h. All required submittals indicated in Divisions 31 through 33 sections.
 - 5. Color Selection: Architect will select colors within 60 days (to allow time for presentation to Owner and for Owner comments) after all color samples have been submitted

including, but not limited to items listed below. The submittal data shall be complete, including shop drawings, product data, and color samples, and all required submittals and materials shall be in compliance with the specifications and be subsequently approved by the Architect. Color samples shall be actual samples of the material and not photographs. If there is a variation in color, shade, texture, or pattern, submit multiple samples to show full range of variation.

- a. Interior Items (including but not limited to):
 - 1) Plastic laminate, solid surface and millwork.
 - 2) Wood door veneer.
 - 3) Ceramic and porcelain tile.
 - 4) Epoxy terrazzo.
 - 5) Precast terrazzo.
 - 6) Resilient wall base and accessories.
 - 7) Carpet tile.
 - 8) Acoustical wall and ceiling panels.
 - 9) Paint.
 - 10) High-performance coatings.
 - 11) Toilet compartments.
 - 12) Signs and cast letters.
 - 13) Casework veneer.
- b. Prefinished Exterior Items (including but not limited to):
 - 1) Brick.
 - 2) Metal wall panels.
 - 3) Copings, perimeter edge systems.
 - 4) Site furnishings and equipment.

C. Submittal Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06 10 00.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06 10 00.01.A).
 - 2) Number and title of appropriate Specification Section.
 - 3) Drawing number and detail references, as appropriate.
 - 4) Location(s) where product is to be installed, as appropriate.
 - 5) Other necessary identification.

D. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on submittals.

- E. Resubmittals:
 - 1. Resubmit submittals until they are marked "No Exception Taken" or "Note Markings".
 - 2. Resubmission of items rejected or marked "Revise and Resubmit" will be reviewed one time by the Architect at no cost to the Contractor. Should the re-submittal be rejected or marked "Revise and Resubmit", the Contractor will reimburse the Owner by credit Change Order for all costs to the Owner for additional time spent by the Architect and the Architect's consultants to review the second (and subsequent) resubmission.
- F. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- G. Use for Construction: Use only final submittals with mark indicating "No Exceptions Taken" or "Note Markings" taken by Architect.

3.11 USE OF ARCHITECT'S AND ARCHITECT'S CONSULTANTS' DRAWING FILES REQUIRING RELEASE FORMS

- A. Copies of Architect's drawing files, listed within required release forms, will be provided to Contractor for Contractor's and trade contractors' use in connection with Project; Contractor must sign and return the release form at the end of this Section. As applicable, the Architect's consultants may require their own releases to be signed and included with the executed Architect's form, and the Architect's consultant may charge a fee for releasing electronic files.
- B. Allow one week for processing and delivery after Architect receives the signed form.
- C. Only the files indicated on Agreement(s) included at end of this Section shall be made available for use as backgrounds for preparation of shop drawings, fabrication drawings and coordination drawings. No other drawing files, for this Project, will be made available.
- D. Contractor does not have the right to release drawing files without first securing a signed Architect's release and, as applicable, the Architect's consultants' forms. Submit executed forms to the Architect by subsequent Application for Payment, with consultant fees as applicable.
- E. Any entity receiving the drawing files shall, to the fullest extent permitted by law, indemnify, defend and hold harmless the Architect, and its consultants from all claims, damages, losses, expenses, penalties and liabilities of any kind, including attorney's fees, arising out of or resulting from the use of the drawing files by the Contractor, or by third party recipients of the drawing files from the Contractor.
- F. Drawing files must not be considered to be Contract Documents as defined by the General Conditions of Contract.

3.12 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional licensed in the State of Maryland, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

3.13 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect through the Web-based Project Management Software.
- C. Verify:
 1. Field Measurements.
 2. Field Construction Criteria.
 3. Catalog Numbers and Similar Data.
 4. Quantities.
- D. Contractor's responsibility regarding errors and omissions in submittals is not relieved by Architect's review of submittals.
- E. Contractor's responsibility regarding deviations in submittals from requirements of Contract Documents is not relieved by Architect's review of submittals, unless Architect gives written acceptance of specific deviations as approved by Owner.
- F. When work is directly related and involves more than one trade, coordinate submittal with other trades and submit under one cover.
- G. After a submittal has been submitted for review, no changes may be made to that Submittal other than changes resulting from review notes made by the Architect unless such changes are clearly identified and circled before being resubmitted. Any failure to comply with this requirement shall nullify and invalidate the Architect's review.
- H. Approval Stamp: Stamp each submittal. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents as indicated below:

THIS IS TO CERTIFY THAT THE SPECIFICATION REQUIREMENTS HAVE BEEN MET AND ALL DIMENSIONS, CONDITIONS, AND QUANTITIES ARE VERIFIED AS SHOWN AND/OR CORRECTED ON THESE DRAWINGS.

SIGNED _____

3.14 ARCHITECT'S/ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it; except where indicated otherwise. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. **NO EXCEPTION TAKEN:** The Work covered by the submittal is accepted as specified and the Work may proceed provided it complies with requirements of the Contract Documents.
 2. **NOTE MARKINGS:** The Work covered by the submittal is accepted as noted and the Work may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
 3. **REVISE AND RESUBMIT:** Do not proceed with the Work covered by the submittal. Revise or prepare a new submittal according to the notations and requirements of the Contract Documents, and resubmit without delay. Unmarked items may be fabricated if indicated.
 4. **REJECTED:** Architect will list reasons for rejection on the submittal or in the transmittal letter accompanying the submittal. Do not proceed with the Work covered by the submittal. Prepare new submittal according to the notations and requirements of the Contract Documents, and resubmit without delay.
 5. **ACTION NOT REQUIRED:** Either the submittal was not requested or the submittal was for information only or for record purposes.
- C. **Informational Submittals:** Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. **Partial submittals** are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. **Submittals not required** by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION



ELECTRONIC MODEL RELEASE FORM

Architect: Grimm + Parker Architects
 11720 Beltsville Drive
 Suite 600
 Calverton, MD 20705

Contractor/CM: <NAME>
 <Address 1>
 <Address 2>

Date: <Date>

Project No: G+P No. 21765.00
 Project: Glenridge Middle School
 Prince George's County Public Schools

Software: Autodesk Revit
 Version: 2017

File Name	Date Revised

Contractor/CM shall pay Architect a fee of (\$0)
 Terms & Conditions:

1. Architect makes no representation as to the compatibility of the Building Information Model (BIM) with any hardware or software.
2. Since the information set forth in the BIM can be modified unintentionally or otherwise, the Architect reserves the right to remove all indicia of its ownership and/or involvement from each electronic display.
3. All information in the BIM is considered instruments of service of the Architect and shall not be used for other projects, for additions to this project, or completion of this project by others. The BIM shall remain the property of the Architect, and in no case shall the transfer of these files be considered a sale.
4. Architect makes no representation regarding the accuracy, completeness, or permanence of the BIM, or for its merchantability or fitness for a particular purpose. Addenda information or revisions made after the date indicated above may not have been incorporated. In the event of a conflict between the Architect's sealed contract drawings and the BIM files, the sealed contract drawings shall govern. It is the Contractor/CM's responsibility to determine if any conflicts exist. The BIM files shall not be considered to be Contract Documents as defined by the General Conditions of the Contract for Construction.
5. The use of BIM files prepared by the Architect shall not in any way obviate the Contractor/CM's responsibility of the proper checking and coordination of dimensions, details, member sizes and gauge, and quantities of materials as required to facilitate complete and accurate fabrication and erection.

6. Contractor does not have the right to release BIM files without first securing a signed Architect's release and, as applicable, the Architect's consultants' forms.
7. Any entity receiving the BIM shall, to the fullest extent permitted by law, indemnify, defend and hold harmless the Architect, and its subconsultants from all claims, damages, losses, expenses, penalties, and liabilities of any kind, including attorney's fees, arising out of or resulting from the use of the BIM files by the Contractor/CM, or by third party recipients of the BIM files from the Contractor/CM.
8. The Architect believes that no licensing or copyright fees are due to others on account of the transfer of the BIM files, but to the extent any are, the Contractor/CM will pay the appropriate fees and hold the Architect harmless from such claims.
9. Any purchase order number provided by the Contractor/CM is for Contractor/CM's accounting purposes only. Purchase order terms and conditions are void and are not a part of this agreement.
10. Payment of the service fee, if applicable, is due upon receipt of the BIM files.
11. This agreement shall be governed by the laws of the principal place of business of the Architect.
12. Any renderings produced from this BIM shall be able to be used by the Architect for promotional and marketing materials free of charge.

AUTHORIZED ACCEPTANCE

By Architect

By Contractor/CM

Signature

Signature

Print Name and Title

Print Name and Title

Date

Date



**An Agreement between Architect and Contractor
for Transfer of Computer Aided Drafting (CAD) Drawing Files**

Architect Grimm + Parker Architects Contractor _____
 11720 Beltsville Drive, Suite 600 _____
 Calverton, MD 20705 _____

Project No. 21765.00 Date _____
Project Name: Glenridge Middle School for
 Prince George's County Public Schools
Location: Landover Hills, MD

The Architect will provide the following CAD Drawing files, dated _____, for the convenience of the Contractor in preparing shop fabrication drawings, coordination drawings, and/or rendered imagery:

TERMS AND CONDITIONS:

1. Architect makes no representation as to the compatibility of the CAD Drawing files with any hardware or software.
2. Since the information set forth on the CAD Drawing files can be modified unintentionally or otherwise, the Architect reserves the right to remove all indicia of its ownership and/or involvement from each electronic display.
3. All information on the CAD Drawing files is considered instruments of service of the Architect and shall not be used for other projects, for additions to this project, or completion of this project by others. CAD Drawing files shall remain the property of the Architect, and in no case shall the transfer of these files be considered a sale.
4. Architect makes no representation regarding the accuracy, completeness, or permanence of CAD Drawing files; nor for their merchantability or fitness for a particular purpose. Addenda information or revisions made after the date indicated on the CAD Drawing files may not have been incorporated. In the event of a conflict between the Architect's sealed contract drawings and CAD Drawing files, the sealed contract drawings shall govern. It is the Contractor's responsibility to determine if any conflicts exist. The CAD Drawing files shall not be considered to be Contract Documents as defined by the General Conditions of Contract.
5. The use of CAD Drawing files prepared by the Architect shall not in any way obviate the Contractor's responsibility of the proper checking and coordination of dimensions, details, member sizes and gage, and quantities of materials as required to facilitate complete and accurate fabrication and erection.
6. Contractor does not have the right to release CAD Drawing files without first securing a signed Architect's release and, as applicable, the Architect's consultants' forms.



7. Any entity receiving the CAD Drawing files shall, to the fullest extent permitted by law, indemnify, defend and hold harmless the Architect, and its Consultants from all claims, damages, losses, expenses, penalties and liabilities of any kind, including attorney's fees, arising out of or resulting from the use of the CAD Drawing files by the Contractor, or by third party recipients of the CAD Drawing files from the Contractor.
8. The Architect believes that no licensing or copyright fees are due to others on account of the transfer of the CAD Drawing files, but to the extent any are, the Contractor will pay the appropriate fees and hold the Architect harmless from such claims.
9. Any purchase order number provided by the Contractor is for Contractor's accounting purposes only. Purchase order terms and conditions are void and are not a part of this agreement.
10. This agreement shall be governed by the laws of the principal place of business of the Architect.

AUTHORIZED ACCEPTANCE

by Architect

by Contractor

Signature

Signature

Print Name and Title

Print Name and Title

Date

Date



SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS LIST

Project: _____

From (Contractor): _____
Date: _____

To (A/E): _____

A/E Project Number: _____
Contract For: _____

List Subcontractors and Major Material Suppliers proposed for use on this Project as required by the Construction Documents. Attach supplemental sheets if necessary.

Section Number	Section Title	Firm	Address	Phone Number (Fax Number)	Contact
-------------------	------------------	------	---------	------------------------------	---------

Attachments

Signed by: _____ Date: _____

Copies: Owner Consultants _____ _____ _____ _____ _____ _____ _____ File

SECTION 01 31 14 - FACILITY SERVICES COORDINATION**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Coordination documents.

1.2 SUBMITTALS

- A. Coordination Drawings and Schedules:

1. Coordination drawings and schedules must be included in submittal schedule; refer to schedule requirements in Section 01 32 16, Construction Progress Schedule.
2. Schedule submittals (product data, shop drawings, etc.) for work represented in Coordination Drawings, prior to completion of coordination drawings when possible.
3. Coordination Drawings must be updated to accurately indicate products submitted after preparation of current Coordination Drawings.
4. Architect's acceptance of submittals prior to completion of coordination drawings to be considered "As Noted" regardless of indication on record; Coordination Drawings must be completed before work without exception.
5. Proceeding with work prior to completion of coordination drawings, including procurement of products or equipment, is at Contractor's risk.
6. Contractor is solely responsible for additional costs to coordinate and fit work contrary or absent of coordination drawings.
7. Refer to Divisions 21 through 28 for additional requirements.

- B. Areas of Work requiring Coordination Drawings include all areas and rooms in this building. Complete the requirements for Coordination Drawings within 75 days of starting construction operations. Prepare Coordination Drawings since limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Content: Project-specific information, drawn accurately to scale.
2. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. The Construction Documents in their original, copies or electronic file form are the Architect's instrument of service and are protected under copyright laws.
3. Include the following information, as applicable:
 - a. Follow routing shown on Contract Drawings for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs.
 - b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - c. Indicate required installation sequences.
 - d. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
4. Number of Copies: Submit digitally via the web-based project management software system.
 - a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.

5. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
6. Each trade shall sign and date the Coordination Drawings after the addition of their information.
7. Do not begin fabrication until receipt of completed Coordination Drawings are acknowledged by the each contractor in writing to the Architect.
8. No progress payments will be made for any work affected by coordination drawings until coordination drawings governing that work have been accepted.
9. Any work installed prior to approval of coordination drawings shall be modified or replaced, as necessary, to conform to subsequently-approved construction drawings, at no additional cost to Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 COORDINATION REQUIRED

- A. Coordinate the work listed below:
 1. Fire Suppression: Division 21.
 2. Plumbing: Division 22.
 3. Heating, Ventilating, and Air Conditioning: Division 23.
 4. Integrated Automation: Division 25.
 5. Electrical: Division 26.
 6. Communications: Division 27.
 7. Electronic Safety and Security: Division 28.
 8. Site Utilities: Division 33.
 9. Commissioning requirements throughout the Project Manual.
- B. Coordinate progress schedules, including dates for submittals and for delivery of products.
- C. Conduct meetings among Subcontractors and others concerned, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.
- D. Participate in progress meetings. Report on progress of work to be adjusted under coordination requirements, and any required changes in schedules. Transmit minutes of meetings and reports to concerned parties.
- E. Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
- F. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
- G. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
- H. Make adequate provisions to accommodate items scheduled for later installation.

3.2 COORDINATION DOCUMENTS

- A. Prepare coordination drawings to organize installation of products for efficient use of available space, for proper sequence of installation, and to identify potential conflicts.

1. Priority of Construction Space:
 - a. Coordinate installation of different components to ensure performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
 - b. Following is the Order of Priority of construction space:
 - 1) First: Ductwork.
 - 2) Second: Fire protection piping.
 - 3) Third: Other piping.
 - 4) Fourth: Conduit.
- B. Prepare a master schedule identifying responsibilities for activities that directly relate to this work, including submittals and temporary utilities; organize by specification section.
- C. Identify electrical power characteristics and control wiring required for each item of equipment.
- D. Maintain maximum headroom at all locations without finished ceilings.
- E. Maintain finished ceiling heights as indicated.
- F. Coordinate installations with other trades to prevent conflict with Work of other trades and cooperate in making reasonable modifications in layout as needed.
- G. Where conflicts occur with placement of mechanical and electrical materials as they relate to placement of other building materials, the Architect shall be consulted for assistance in coordination of the available space to accommodate all trades.
- H. Maintain documents for the duration of the work, recording changes due to site instructions, modifications or adjustments.
- I. Any construction delays required to accomplish coordination, approval of submittals or re-submittals, or consequent to coordination work, shall be incurred at no additional cost to Owner; such delays may include, but not be limited to , the following:
 1. Time taken for preparation and submission of acceptable coordination drawings, including a reasonable period for Architect's review and approval.
 2. Time taken for preparation and approval of acceptable mock-ups.
 3. Time taken for modifications and replacements of non-conforming work.

3.3 COORDINATION OF SUBMITTALS

- A. Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination with related work. Transmit copies of reviewed documents to Architect.
- B. Check field dimensions and clearances and relationship to available space and anchors.
- C. Check compatibility with equipment and work of other sections, electrical characteristics, and operational control requirements.
- D. Check motor voltages and control characteristics.
- E. Coordinate controls, interlocks, wiring of switches, and relays.
- F. Coordinate wiring and control diagrams.
- G. When changes in the work are made, review their effect on other work.
- H. Verify information and coordinate maintenance of record documents.

3.4 COORDINATION OF SUBSTITUTIONS AND MODIFICATIONS

- A. Review proposals and requests for substitution prior to submission to Architect.
- B. Verify compliance with Contract Documents and for compatibility with work of other sections.

3.5 ABOVE-CEILING PRE-CONSTRUCTION CONFERENCE

- A. Schedule and conduct with all affected parties present to review procedures for addressing potential conflicts, review of Coordination Drawings and obtain approval of each affected trade to ensure components, materials, and systems can be installed as intended prior to the Work being performed.
 - 1. Identify Above-Ceiling Pre-Construction Conference on the Construction Schedule as a “milestone” date.
 - 2. Advise the Architect of potential conflicts identified in the Coordination Drawings (if furnished) and Above-Ceiling Pre-Construction Conference.
 - 3. Do not proceed with construction or installation of the components, materials, and systems until potential conflicts identified have been resolved and affected parties have agreed to a remedy.
- B. Remedies to address conflicts not identified in the Coordination Drawings, Above-Ceiling Pre-Construction Conference, or otherwise addressed prior to construction or installation of the affected components, materials, and systems; or discovery of a non-workable situation without Coordination Drawings on file with the Owner will not be considered as a basis of delay, time extension, or additional cost to the Contract.

3.6 OBSERVATION OF WORK

- A. Observe work for compliance with Contract Documents.
- B. Maintain a list of observed deficiencies and defects; promptly submit.

3.7 EQUIPMENT START-UP

- A. Verify utilities, connections, and controls are complete and equipment is in operable condition as required by Section 01 70 00.
- B. Observe start-up and adjustments, test run, record time and date of start-up, and results.
- C. Observe equipment demonstrations made to Owner; record times and additional information required for operation and maintenance manuals.

3.8 INSPECTION AND ACCEPTANCE OF EQUIPMENT

- A. Prior to inspection, verify that equipment is tested, operational, clean, and ready for operation.
- B. Assist Architect with review. Prepare list of items to be completed and corrected.

END OF SECTION

SECTION 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Preliminary schedule.
- B. Construction progress schedule, with network analysis diagrams and reports.
- C. Responsibility for completion of Work per schedule and preparation of recovery schedules.

1.2 SUBMITTALS

- A. Within 15 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- G. Submit under transmittal letter form specified in Section 01 30 00 - Administrative Requirements.

1.3 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

PART 2 PRODUCTS - NOT USED**PART 3 EXECUTION****3.1 PRELIMINARY SCHEDULE**

- A. Prepare preliminary schedule in the form of a preliminary network diagram.

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- C. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- D. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals

will be required from Architect, within the Web-based Project Management Software. Indicate decision dates for selection of finishes.

1. The Architect shall maintain the submittal log between the Architect and Contractor through Web-based Project Management Software.
 2. Contractor to maintain a submittal log with subcontractors.
- E. Coordinate content with schedule of values specified in Section 01 20 00 - Price and Payment Procedures.
- F. Provide legend for symbols and abbreviations used.

3.3 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
1. Preceding and following event numbers.
 2. Activity description.
 3. Estimated duration of activity, in maximum 15 day intervals.
 4. Earliest start date.
 5. Earliest finish date.
 6. Actual start date.
 7. Actual finish date.
 8. Latest start date.
 9. Latest finish date.
 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 11. Monetary value of activity, keyed to Schedule of Values.
 12. Percentage of activity completed.
 13. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
1. By preceding work item or event number from lowest to highest.
 2. By amount of float, then in order of early start.

3.4 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.5 FLOAT TIME

- A. Float is not for the exclusive benefit of either Contractor or Owner.
- B. Manage work according to early start dates, by commencing activities on the early start date (calculated by the latest approved Contract Schedule) or earlier if possible, unless constrained by a bona fide resource limitation.
- C. Owner may reserve and apportion float time according to the needs of the Project.

- D. Actual or projected Owner-caused delays that do not exceed available float time shall not have any effect upon Contractor's adherence to specified time constraints and shall not be a basis for any time extension.
- E. Contractor acknowledges the following:
 - 1. Activity delays shall not automatically result in adjustment of specified time constraints.
 - 2. A Change Order or other Owner action or inaction may not affect existing critical activities or cause non-critical activities to become critical.
 - 3. A Change Order or delay may result in only absorbing a part of the available total float that may exist within an activity chain of the network, thereby not causing any effect on specified time constraints.
- F. Pursuant to the above float sharing requirements, use of float released by elimination of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, unreasonably extended activity durations, or imposed dates shall be distributed by Owner to the benefit of Owner and Contractor.
- G. In the event of the Contractor wishes to complete the Work earlier than the time specified therefore:
 - 1. Continue to calculate float based on the Work completion date specified as of Contract execution, by maintaining the specified Work completion date as a "finish-no-later-than" constraint.
 - 2. The completion time for the Work shall be amended by Owner's acceptance of or acquiescence to Contractor's proposed earlier completion date.
 - 3. Contractor shall not, under any circumstances, receive additional compensation for indirect, general, administrative or other forms of overhead costs, for the period between the time of earlier completion proposed by Contractor and the completion time for the Work specified as of NTP.

3.6 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.7 RESPONSIBILITY FOR COMPLETION

- A. Take a combination of the following actions, at no additional cost to the Owner, when the progress schedule illustrates that the Contract Substantial Completion date can not be met:
 - 1. Increase construction manpower in such quantities and trades to substantially eliminate the backlog of Work.
 - 2. Increase the number of work hours per shift, shifts per working day, working days per week, or the amount of construction equipment, or any combination to substantially eliminate the backlog of Work.

3. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities.
- B. Recovery Schedule: Prepare a recovery schedule from all trades to accelerate progress, if a milestone is missed, a single duration work activity is incomplete for ten work days, or overall work progress is deemed insufficient by the Owner/Architect.
1. A recovery schedule must be initiated by the Contractor, reviewed by effected trade contractors and submitted ten working days after one of the above conditions occurs.
 2. Submit recovery schedule in same number of copies as original.
 3. Trades must execute means necessary to bring the Project back on schedule using the recovery schedule; accelerated Work and additional overhead necessary to keep the Project on schedule is included in the Contract.
 4. Recovery schedule to be double the size of the original diagram, as a minimum, illustrating existing and revised activities alongside original data; revised activities must be easily differentiated from original schedule.
- C. Failure of the Contractor to comply with requirements of this subsection may be a basis for determination that the Contractor is not prosecuting the Work with such diligence as will ensure completion within the time stipulated; upon such determination, the Owner may take such action deemed appropriate.
- 3.8 DISTRIBUTION OF SCHEDULE
- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
 - B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 35 13 - SPECIAL PROJECT PROCEDURES FOR BUILDING ENCLOSURE**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes Contractor's quality assurance and quality control requirements for building enclosure Work.
- B. Section includes provisions for Special Building Enclosure Warranty (Alternate Bid).

1.2 DEFINITIONS

- A. Building Enclosure Work: Work related to components assembled into coordinated assemblies enclosing protected and conditioned interior spaces.
 - 1. Assembly includes cold-formed metal envelope wall framing and secondary framing systems required for enclosure; includes delegated design.
- B. Air Barrier System: The airtight components of the building enclosure and the joints, junctures, interfaces, and transitions between the air barrier assembly and other materials, products, and assemblies providing the air-tight performance of the total building enclosure.
- C. Waterproofing System: The waterproof components of the building enclosure intended to resist hydrostatic head and the joints, junctures, interfaces, and transitions between the waterproofing work and other materials, products, and assemblies.
- D. Fire Propagation Compliant Assembly: Collection of components tested for compliance with NFPA 285, Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

1.3 SUBMITTALS

- A. Submittals Procedures for Building Enclosure Work:
 - 1. Refer to individual specification sections for submittals applicable to specific Sections.
 - 2. Assemble submittals for exterior enclosure assembly, in single consolidated package in accordance with requirements specified in Division 01 Section "Submittal Procedures;" refer to Coordination paragraph of this Section for additional requirements.
 - 3. Include informational submittals for delegated design of cold-formed metal envelope wall framing and secondary framing systems required for enclosure.
 - 4. Individual submittals will be returned without review, or held by the Architect until such time as wall assembly submittals are deemed complete.
- B. Coordination Drawings for Building Enclosure Work: Prepare and submit project-specific coordination drawings, drawn to scale, on which the following items are shown and coordinated with each installer of building enclosure components. Include the following information, as applicable:
 - 1. Submit coordination drawings in accordance with requirements of Division 01 Section "Administrative Requirements."
 - 2. Entity issuing single source Building Enclosure Warranty (under Alternate Bid) to initiate and manage completion of coordination drawings for building enclosure Work. Without acceptance of Alternate Bid, the Contractor must bear this coordination of subcontractors.
 - 3. Refer to individual sections for specific shop drawing requirements for building enclosure products and equipment. Show interfaces and relationship of components shown on separate shop drawings.
 - 4. Include details of treatment of penetrations in building envelope by Work of other Sections.

5. Show dimensions and clearances of interrelated building enclosure Work.
 6. Indicate required installation sequences of interrelated building enclosure Work.
 7. Include information necessary for interface with other building components.
 8. Field Conditions: Indicated interface conditions encountered during construction that inhibit installation of a continuous air barrier conducive to successful testing and long-term serviceability and review "boxing out" the interface with the Architect.
- C. Product List: Indicate products of separate manufacturers that will be in contact with one another. Submit individual manufacturers' certificates indicating products as proposed are compatible.
- D. Qualification Data: For Contractor's building enclosure coordinator and inspectors, to demonstrate capabilities and experience.
- E. Contractor and Installer Certifications: Provide a letter, signed by the Contractor and building enclosure subcontractors stating that each acknowledges in writing that the Owner regards the new building enclosure to be an important and performance-sensitive single element of the Project. Acknowledge that the Contractor and building enclosure subcontractors are solely responsible for the quality and coordination of building enclosure materials, components and systems such that the materials, components, and systems result in a fully integrated, weather-tight building enclosure that is in compliance with the Construction Documents and regulatory requirements of NFPA 285.
- F. Other Informational Submittals:
1. Examination reports documenting inspections of substrates, areas, and conditions.
 2. Photographic documentation of concealed portions of building enclosure Work.
 3. Field quality-control reports documenting inspections of installed products.
 4. Field quality-control certification, signed by Contractor and building enclosure component installer.
 5. Engineering Judgement accepted by authority having jurisdiction for deviation of materials within NFPA 285 tested assemblies.
- G. Delegated Design Submittals:
1. Shop drawings and calculations required to be signed and sealed by a professional engineer registered in the State of Maryland, within individual sections, pertaining to cold-formed metal envelope wall framing and secondary framing systems, must reference live and dead load requirements and anchorage for full exterior enclosure system; indicate process for calculation or assembly dead loads.
 2. Provide a letter signed by the Contractor and building enclosure subcontractors and employed professional engineers, stating they have coordinated live and dead load data, and anchorage connections to secondary framing and cold-formed building enclosure wall framing.

1.4 QUALITY ASSURANCE

- A. Building Enclosure Coordinator: Assign an experienced employee, as coordinator, to oversee installation of building enclosure products who has completed building enclosure Work installations similar in material, design, and extent to that indicated for Project, and whose work has resulted in construction with a record of successful in-service performance, and meeting the following requirements:
1. Experienced in administration and supervision of building enclosure Work and integration of its various components.
 2. Minimum of three years' experience installing similar Work or equivalent, and minimum one year supervisory experience, able to communicate verbally with Contractor, Architect, and installers of building enclosure Work.

- B. Inspector Qualifications: Provide qualified field technical personnel experienced in observations and inspection of components of the building enclosure, to perform Contractor's required building enclosure quality assurance and quality control activities, with the following qualifications:
 - 1. Certified as a Registered Roof Observer by RCI International (RCI).
 - 2. Certified as Air Barrier Installer by Air Barrier Association of America (ABAA).
 - 3. Certified as EIFS Inspector by the Association of the Wall and Ceiling Industry (AWCI).
 - 4. Certified as Installer by American Window and Door Institute (AWDI) or American Architectural Manufacturers Association (AAMA).
 - 5. Certified as installer or inspector by manufacturer of waterproofing system.
- C. Installer Qualifications: Refer to applicable individual Division 02 through Division 09 Sections.
- D. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

1.5 BUILDING ENCLOSURE COORDINATOR

- A. Building Enclosure Coordinator Responsibilities:
 - 1. Coordinate scheduling of building enclosure work to enable testing and inspection prior to concealing Work.
 - a. Notify Architect when testing is scheduled; Architect reserves the right to attend the testing and inspection.
 - 2. Coordinate submittals process for building enclosure work. Approve building enclosure submittals.
 - 3. Coordinate preparation of building enclosure coordination drawings.
 - 4. Coordinate exchange of data for loading and anchorage data, to professional engineers engaged in delegated design responsibilities for building enclosure.
 - 5. Coordinate installation of building enclosure products.
 - 6. Supervise field quality-control services for building enclosure work identified as the responsibility of the Contractor.
 - 7. Expedite testing and minimize unnecessary delays, while not compromising integrity of tests; do not overlook deficient work or loosen acceptance criteria to satisfy scheduling or cost issues unless directed to do so by the Owner with consultation of Commissioning Authority.
 - 8. Coordinate field quality-control services for building enclosure work identified as the responsibility of the Owner's testing agency.
 - 9. Coordinate activities of Commissioning Authority.

1.6 COORDINATION

- A. Coordinate building enclosure work to ensure efficient and orderly installation and proper performance of each component of building enclosure Work and to achieve building enclosure performance specified. Coordinate building enclosure Work that depends on separate entities for proper installation, connection, and performance.
 - 1. Develop special procedures required for coordination of building enclosure Work.
 - 2. Coordinate installation of building enclosure components to ensure maximum accessibility for required maintenance, service, and repair.
- B. Coordinate selection of building enclosure products for compatibility and regulatory requirements of NFPA 285.
 - 1. Products specified in this Project Manual, for exterior assemblies, have been tested with NFPA 285 compliant assemblies; the specifications do not attempt to assign products to be used in final construction.

2. Contractor must coordinate with building enclosure subcontractors to assemble a collection of products tested together for NFPA compliance.
 3. Any deviation in products from a tested NFPA 285 assemblies requires approval of authority having jurisdiction and an Engineering Judgement.
 4. Engineering Judgements required for enclosure assemblies are the responsibility of the Contractor, at no additional cost to Owner.
 5. Comparable Product and Substitution requests for products within a NFPA 285 assembly are subject to the requirements of this Section.
 - a. Ensure products not specified in the Project Manual and incorporated into the final construction have been tested as part of NFPA 285 compliant assemblies
- C. Assemble and coordinate shop drawings for building enclosure Work provided by separate installers. Submit building enclosure Work submittals from all participants simultaneously, along with coordination drawings.
1. Coordinate sequencing and scheduling of building enclosure Work. Prepare and integrate a subschedule to Contractor's construction schedule for building enclosure Work. Secure time commitments for performing critical construction activities from separate installers whose Work affects schedule of building enclosure Work.
 2. Schedule construction operations in sequence required to obtain best results where installation of one part of building enclosure Work depends on installation of other components, before or after its own installation.
 3. Coordinate work of separate installers to ensure installation of continuous air barrier and thermal insulation assemblies.
 4. Coordinate sequence of building enclosure Work activities to accommodate tests and inspections.
- D. Refer to Division 1 Sections "Administrative Requirements" for additional requirements and coordination associated with Delegated Design.
- E. Coordinate installation of anchorages and embedments for building enclosure Work. Obtain and distribute, to parties involved, setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in building superstructure. Deliver such items to Project site in time for installation.
1. Check shop drawings of other Work to verify that adequate provisions are made for locating and installing building enclosure Work to comply with indicated requirements.
- F. Coordinate temporary facilities and controls required by building enclosure Work.
- G. Coordinate, schedule, and approve selective demolition of existing building enclosure to enable connection of new building enclosure work to existing.
- H. Coordinate protection of building enclosure Work.
- I. Coordinate preparation of Project Record Documents for building enclosure Work.

1.7 PROCEDURES

- A. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of building enclosure Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of building enclosure Work subschedule for Contractor's Construction Schedule.
 2. Installation and removal of temporary facilities and controls for building enclosure Work.
 3. Delivery and processing of building enclosure Work submittals.

4. Preinstallation conferences for building enclosure Work.
 5. Project closeout activities for building enclosure Work.
- B. Notifications: Prepare memoranda for distribution to each party involved with building enclosure work, outlining special procedures required for coordination of building enclosure Work. Include such items as required notices, reports, and attendance at meetings.
- C. Coordination Meetings: In addition to coordination meetings specified in Division 01 Section "Project Management and Coordination," conduct coordination meetings specifically for building enclosure Work at weekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, Commissioning Authority, and Contractor, each subcontractor, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of future building enclosure Work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to building enclosure Work.
 - a. Notify Architect when Coordination Meetings are scheduled; Architect reserves the right to attend the Coordination Meetings.
 2. Agenda: Review and correct or approve minutes of previous building enclosure Work coordination meeting. Review other items of significance that could affect progress of building enclosure Work. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Building Enclosure Work Subschedule: Review progress since last building enclosure Work coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the contract time.
 - b. Schedule Updating: Revise Contractor's building enclosure Work subschedule after each building enclosure Work coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each entity present, including the following:
 - 1) Building enclosure Work interface requirements.
 - 2) Sequence of building enclosure Work operations.
 - 3) Status of building enclosure Work submittals.
 - 4) Access to building enclosure Work.
 - 5) Temporary facilities and controls required by building enclosure Work.
 - 6) Quality and work standards of building enclosure Work.
 - 7) Change Orders for building enclosure Work.
 - d. Typical Installation Limitations: Different limitations may exist for different components of a product installation, such as for primer and contact adhesive applications. When multiple products are specified in an assembly, a thorough review of corresponding product literature is required to understand constraints for each product, as well as compatibility with adjacent materials. Review the following:
 - 1) Low or high dry-bulb temperatures for the substrate surface and ambient environment.
 - 2) Allowable moisture content in the substrate and ambient environment.
 - 3) Exposure to bulk water immediately following application of the product (specifically for fluid-applied products that require drying time).
 - 4) Protection of exposed substrates adjacent to and above the installed product.

- 5) Acceptable surface profiles and conditions.
 - 6) Sufficient curing of cementitious substrates.
 - 7) Acceptable cleaning methods before and after product installation.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.8 WARRANTY

- A. The provisions of this Warranty subsection is in addition to special warrantees, including material and finish warrantees, specified in other sections of this Project Manual.
- B. Special Building Enclosure Warranty - Alternate Bid: A single manufacturer or installing trade contractor of building enclosure components incorporated in the Work of this Project must agree to repair or replace components of rainscreen building enclosure assemblies that fail in materials or workmanship within specified warranty period, including cladding removal and access to make repairs eliminating leaks.
 1. Failures include:
 - a. Inability to pass any specified test or inspection indicated for any component of the building enclosure, including interface to Division 8 units and assemblies.
 - b. Water leaks within or through the building enclosure assemblies.
 2. The warranty holder's obligation is to furnish materials and labor to repair affected areas and return building enclosure assemblies to water- and air-tight condition.
- C. Warranty coverage applies to any component to the exterior-side of the supporting structure; exterior sheathing accepted by holder of this warranty is exempt from the coverage of this warranty, except when a sheathing product with factory applied air barrier is provided.
- D. Brick veneer with masonry unit backup assemblies are excluded from the scope of this Special Building Enclosure Warranty, except for interface to adjacent subject assemblies. Assemblies applied to concrete backup construction are excluded from this Special Building Enclosure Warranty, except for interface to adjacent subject assemblies.
- E. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with related installers present, for compliance with requirements for installation tolerances and other conditions affecting performance of building enclosure Work.
 1. Examine roughing-in for penetrations and built-in anchors before building enclosure Work installation.
 2. For the record, prepare written report, endorsed by each installer, listing conditions detrimental to performance of building enclosure Work.
- B. Verify locations of building enclosure Work with those indicated on Coordination Drawings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FIELD QUALITY CONTROL

- A. Contractor's Quality Control Inspection: Inspect installed building enclosure Work to verify compliance with requirements.
 1. Continuously inspect installation of building enclosure Work according to manufacturer's written instructions.

2. Coordinate inspections specified in other sections to enable inspection of Work prior to concealment by subsequent Work.
 3. Prepare inspection reports and document compliance with Contract Documents.
 4. Perform additional inspections to determine compliance of replaced or additional Work. Prepare inspection reports.
 5. Prepare field quality-control certification that states installed building enclosure Work complies with requirements in the Contract Documents.
 6. Inspection Documentation: Provide digital photograph documentation of building enclosure Work to be concealed that visibly demonstrates compliance with application requirements, at a scale and quantity acceptable to the Architect. Label documentation sequentially to indicate location on building envelope, elements included, and time and date of documentation.
 7. Qualitative inspections include, but not limited to:
 - a. Continuity of the air barrier system throughout the building enclosure with no gaps, holes.
 - b. Structural support of the air barrier system to withstand design air pressures.
 - c. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions and mortar droppings.
 - d. Site conditions for application temperature and dryness of substrates.
 - e. Maximum length of exposure time of materials to ultra-violet deterioration.
 - f. Surfaces are properly primed.
 - g. Laps in material are as required by manufacturer and shingled in the correct direction (or mastic applied on exposed edges), with no fish-mouths.
 - h. Mastic applied on cut edges.
 - i. Roller has been used to enhance adhesion.
 - j. Application thickness of liquid-applied materials to manufacturer's specifications for the specific substrate.
 - k. Compatibility of interfacing materials.
 - l. Transitions at changes in direction, and structural support at gaps.
 - m. Connections between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.
 - n. All penetrations sealed.
- B. Testing and Inspection:
1. Engage qualified third party to provide testing and inspections during installation of building enclosure component; provisions for ABAA auditor does not replace this requirement.
 - a. Testing agency must provide qualified personnel to perform required inspections and tests.
 - b. Testing agency must notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - c. Testing agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
 - d. Testing agency must not perform any duties of the Contractor.
 2. Coordinate testing for compliance with requirements in accordance with testing requirements in other sections.
 - a. Coordinate testing and inspection activities to verify installation meets performance requirements specified in Division 01 Section "Exterior Enclosure Performance Requirements."

3. Notify Owner and Architect no less than 10 days prior to dates building enclosure components will be ready for testing.
 4. Provide safe access to both interior and exterior sides of test areas.
 5. Provide clear, unobstructed interior space at each test area.
 6. Provide necessary temporary services.
 7. Correct installation Work and retest after Work is corrected.
 8. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional Work.
- C. Specific quality-control requirements for individual construction activities are specified in the sections of the specifications. Each installer must completely perform the quality assurance documentation, tests and procedures required by each section.
- D. Owner may retain a separate testing agency to perform inspections and testing during and upon completion of portions of building enclosure Work. Coordinate and cooperate with testing activities of Owner's testing agency.
1. Potential testing may include a whole building pressure (blower door, etc.) testing of building envelope in accordance with this specification section and ASTM E779 by independent agency.
 2. Correct installation Work and retest after Work is corrected.
 3. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional Work.

END OF SECTION

SECTION 01 35 53 - SECURITY PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Security measures including formal security program, entry control, and personnel identification.

1.2 SECURITY PROGRAM

- A. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
- B. Initiate program at project mobilization.
- C. Maintain program throughout construction period until Owner occupancy.

1.3 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site and existing facilities.
- B. Allow entrance only to authorized persons with proper identification.
- C. Maintain log of workers and visitors, make available to Owner on request.
- D. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.4 PERSONNEL IDENTIFICATION

- A. Provide identification badge to each person authorized to enter premises.
- B. Badge To Include: Personal photograph, name, assigned number, expiration date and employer.
- C. Maintain a list of accredited persons, submit copy to Owner on request.
- D. Require return of badges at expiration of their employment on the Work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 40 00 - QUALITY REQUIREMENTS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Contractor's construction-related professional design services.
- F. Contractor's design-related professional design services.
- G. Control of installation.
- H. Tolerances.
- I. Manufacturers' field services.
- J. Defect Assessment.

1.2 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).
- B. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2017.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2015a, with Editorial Revision (2016).
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2014a.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2015.
- G. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2017.

1.3 DEFINITIONS

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.
- B. Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.
 - b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of

the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.

- C. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.4 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
 - 1. Temporary sheeting, shoring, or supports.
 - 2. Temporary scaffolding.
 - 3. Temporary bracing.
 - 4. Temporary falsework for support of spanning or arched structures.
 - 5. Temporary stairs or steps required for construction access only.
 - 6. Temporary hoist(s) and rigging.
 - 7. Investigation of soil conditions to support construction equipment.

1.5 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
 - 1. Submit a Request for Interpretation to Architect if the criteria indicated are not sufficient to perform required design services.
- C. Scope of Contractor's Professional Design Services: Provide as indicated in Contract Documents including, but not limited to, assemblies indicated as Delegated Design.

1.6 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Schedule of Tests and Inspections: Prepare in tabular form, within 30 days following mobilization, and include the following:
 - 1. Specification section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the contract documents, or for Owner's information.
- D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.

- b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the contract documents, or for Owner's information.
- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit report in duplicate within 30 days of observation to Architect for information.
 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the contract documents.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 3. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.
- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State of Maryland.
- C. Contractor's Quality Control (CQC) Plan:
1. Prior to start of work, submit a comprehensive plan describing how contract deliverables will be produced. Tailor CQC plan to specific requirements of the project. Include the following information:

- a. Management Structure: Identify personnel responsible for quality. Include a chart showing lines of authority.
 - 1) Include qualifications (in resume form), duties, responsibilities of each person assigned to CQC function.
 - b. Management Approach: Define, describe, and include in the plan specific methodologies used in executing the work.
 - 1) Management and control of documents and records relating to quality.
 - 2) Communications.
 - 3) Coordination procedures.
 - 4) Resource management.
 - 5) Process control.
 - 6) Inspection and testing procedures and scheduling.
 - 7) Control of noncomplying work.
 - 8) Tracking deficiencies from identification, through acceptable corrective action, and verification.
 - 9) Control of testing and measuring equipment.
 - 10) Project materials certification.
 - 11) Managerial continuity and flexibility.
 - c. Owner will not make a separate payment for providing and maintaining a Quality Control Plan. Include associated costs in Bid price.
 - d. Acceptance of the plan is required prior to start of construction activities not including mobilization work. Owner's acceptance of the plan will be conditional and predicated on continuing satisfactory adherence to the plan. Owner reserves the right to require Contractor to make changes to the plan and operations, including removal of personnel, as necessary, to obtain specified quality of work results.
- D. Quality-Control Personnel Qualifications. Engage a person with requisite training and experience to implement and manage quality assurance (QA) and quality control (QC) for the project.

1.8 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.9 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform specified testing.

1. Testing and inspection identified within Section 00900, Material Tests and Construction Inspections will be paid from Allowance funds; refer to Section 01 21 00, Allowances.
 2. For any other testing or inspections required within the Project Manual, the specification section must clearly state that testing is the Owner's responsibility, otherwise the testing and inspection services are to be paid and executed by Contractor with third party entity.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:
1. Testing agency: Comply with requirements of ASTM E 329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
 3. Laboratory: Authorized to operate in the State of Maryland.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.
- H. Contractor must develop a plan to monitor and control installation and protection of Work to ensure compliance with LEED requirements specified elsewhere and acoustical integrity, including but not limited to the following:
 1. Clear airspace with no bridging elements at structural isolation joints.
 2. Independence of steel stud framing and/or masonry at double/triple wall construction.
 3. Mass and airtightness of gypsum board assemblies.
 4. Solidity, mass, and airtightness of concrete and masonry construction.
 5. Grout fill at sound-rated/sound-control door and window frames.
 6. Mass of sound-control door leaves.
 7. Tolerances between sound-rated/sound-control doors, frames, thresholds, and perimeter seals.
 8. Proper compression and adjustment of perimeter seals at sound-rated/sound-control doors.
 9. Locations and quiet operation of door latching and closer hardware.
 10. Tolerances between window sashes, frames, and perimeter seals.
 11. Thicknesses of laminated glazing and airtightness of perimeter seals at sound-control windows
 12. Extent and coverage of sound-attenuation blankets above ceilings and in partitions.

13. Shaping of wall and ceiling finishes.
14. Extent, location, and thickness of sound-absorbing finishes.
15. Extent, location, operation, and storage of adjustable sound-absorbing drapery.
16. Extent and shaping of ceiling reflectors.
17. Acoustical transparency of scrim materials.
18. Rigid attachment of finish materials to substrates.
19. Restrictions on routing of ductwork, piping, conduit, wiring, cable and sleeves.
20. Resilient sealing of penetrations.
21. Sheet caulking at electrical boxes within gypsum board assemblies.
22. Flexible connections of plumbing, mechanical, electrical, and communications systems at equipment and structural isolation joints.
23. Sound power/pressure level limits of mechanical equipment and air devices.
24. Vibration isolation of conveying, plumbing, mechanical, electrical, and communications systems.
25. Location and performance of duct sound attenuators.
26. Internal duct lining in ductwork, plenums, and shafts.
27. External lagging of ductwork and piping.
28. Locations of volume control dampers.
29. Location and orientation of transfer ducts.
30. Reports for testing, adjusting, and balancing of HVAC systems.
31. Silent operation of theatrical and architectural lighting.
32. Silent operation of fluorescent ballasts.
33. Silent operation of fire alarm system in standby mode.
34. Remote location of transformers and power supplies.

3.2 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.3 TESTING AND INSPECTION

- A. Testing Agency Duties:
 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 2. Perform specified sampling and testing of products in accordance with specified standards.
 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 5. Perform additional tests and inspections required by Architect.
 6. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.

- C. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.4 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.5 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION

SECTION 01 41 00 - REGULATORY REQUIREMENTS**PART 1 GENERAL****1.1 SUMMARY OF REFERENCE STANDARDS**

- A. Regulatory requirements applicable to this project are the following:
- B. 28 CFR 35 - Nondiscrimination on the Basis of Disability in State and Local Government Services; Final Rule; Department of Justice current edition.
- C. 28 CFR 36 - Nondiscrimination by Public Accommodations and in Commercial Facilities; Final Rule; Department of Justice current edition.
- D. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.
- E. 49 CFR 27, 37, and 38 - Transportation for Individuals with Disabilities; Final Rule; Department of Transportation current edition.
- F. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- G. FED-STD-795 - Uniform Federal Accessibility Standards (UFAS) 1988.
- H. 29 CFR 1910 - Occupational Safety and Health Standards current edition.
- I. State of Maryland amendments to some or all of the following.
- J. City of Upper Marlboro amendments to some or all of the following.
- K. Zoning Code: 20772.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- M. ICC (IFC) - International Fire Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. NFPA 1 - Fire Code 2018.
- O. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- P. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Q. ICC (IPC) - International Plumbing Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- R. IAPMO (UPC) - Uniform Plumbing Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- S. ICC (IMC) - International Mechanical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- T. IAPMO (UPC) - Uniform Plumbing Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- U. ICC (IFGC) - International Fuel Gas Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- V. ICC (IPSDC) - International Private Sewage Disposal Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- W. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

- X. ICC (IECC) - International Energy Conservation Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Y. ICC (IPMC) - International Property Maintenance Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.2 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.3 SECTION INCLUDES

- A. General: Comply with the applicable Articles and Sections of the Annotated Code of Maryland.

1.4 QUALITY ASSURANCE

- A. General Safety and Health Regulations.
- B. Discrimination
- C. Environmental Statutes and Regulations
- D. Miscellaneous Regulations.
 - 1. Buy American Steel Act
 - 2. Financial Disclosure
 - 3. Political Contribution Disclosure
 - 4. Retention of Records

1.5 GENERAL SAFETY AND HEALTH REGULATIONS.

- A. The use of products containing asbestos will not be permitted.
- B. Nothing contained in the Contract shall be construed as relieving Contractor in any way of Contractor's responsibility for strict compliance with all governmental requirements, pertaining to health and safety.
- C. The Contract is to be governed at all times by applicable provisions of federal law, including but not limited to the following:
 - 1. Williams-Steiger Occupational Safety and Health Act of 1970, Public Law 91-596.
 - 2. Part 1910 - Occupational Safety and Health Standards, Chapter XIII of Title 29, Code of Federal Regulations
 - 3. Maryland State Safety Health Act (MOSHA)
- D. MARYLAND BUY AMERICAN STEEL ACT: The Contractor shall comply with Section 17-301 through Section 17-306 of Annotated Code of Maryland, State Finance and Procurement Article. The "Buy American Steel" Act of Maryland defines "steel products" as any product: "rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed, or processed by a combination of two or more of such operations, from steel made in the United States by the open hearth, basic oxygen, electric furnace, bessemer, or other steel making process."
- E. Project safety procedures/policies for construction activities shall be adhered to at all times. Refer to PART 3 - EXECUTION for further safety information and requirements.

1.6 DISCRIMINATION

- A. FINANCIAL DISCLOSURE: The Contractor shall comply with the provisions of Section 13-221 of the State Finance and Procurement Article, Annotated Code of Maryland. Every business that enters into contracts, leases, or other agreements, with that State of Maryland or

its agencies, during a calendar year under which the business is to receive in the aggregate \$100,000 or more, shall within 30 days of the time when aggregate value of these contracts, leases to other agreements reached \$100,000, file with the Secretary of State of Maryland certain specified information to include disclosure of beneficial ownership of the business.

- B. **POLITICAL CONTRIBUTION DISCLOSURE:** The Contractor shall comply with the provisions of Article 33, Section 30-1 through 30-4 the Annotated Code of Maryland, which requires that every person that enters into contracts, leases, or other agreements with the State of Maryland during a calendar year under which the business is to receive in the aggregate \$10,000 or more, shall on or before February 1, of the following year file with the Secretary of State of Maryland certain specified information to include disclosure of political contributions in excess of \$100 to a candidate for elective office in any primary or general election.
- C. **RETENTION OF RECORDS:** The Contractor shall retain and maintain all records and documents relating to this contract for three years after final payment by the Owner or any applicable statute of limitations, whichever is longer, and shall make them available for inspection and audit by the Owners authorized representatives at all times.
- D. **DRUGS, TOBACCO AND ALCOHOL:** All of the School properties are "drug, tobacco, and alcohol free zones" as designated by state and local laws. Neither the Contractor nor any of his employees or subcontractors are permitted to have any drugs, tobacco, or alcohol products on school property. Use or possession of such items on school properties will result in immediate termination of the Contract. Upon termination of the contract, the contractor will be paid for all services performed to date but will not be paid for any lost or anticipated profits due to termination of the Contract. The Contractor will be removed from all bids with the Prince George's County Public Schools for a period not to exceed two years. Prince George's County Public Schools will provide an unsatisfactory reference when inquiries are made.
- E. The Contractor shall not discriminate against any employee or applicant because of race, creed, color or national origin. The Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, creed, color or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer; rates of pay or other forms of compensation; and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment notices to be provide by the Owner concerning discrimination.
- F. The Contractor shall send to each labor union or representative of workers with which he has collective bargaining agreements or contract or understanding a notice to be provided by the Owner advising the said union or worker's representative of the Contractor's commitments under this section, and the Contractor shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- G. The Contractor shall furnish, if requested by the Owner a compliance report concerning their employment practices and policies in order for the Owner to ascertain compliance with the special provisions of this contract concerning discrimination in employment.
- H. In the event of the Contractor's noncompliance with the nondiscrimination clause of this contract, this contract maybe canceled, terminated or suspended in whole or in part and the Contractor may be declared in eligible for further Prince George's County Public School work.
- I. The Contractor shall include the special provisions outlined herein, pertaining to nondiscrimination in employment in every subcontract or purchase order utilized by him in order to carry out the terms and conditions of this contract. So that such nondiscrimination in employment provisions shall be binding on each subcontract.

1.7 ENVIRONMENTAL PROTECTION

- A. Contractor shall comply with all applicable provisions of federal and state laws dealing with the prevention of environmental pollution and the preservation of natural resources, including but not limited to the Federal Air Quality Act of 1967; the Clean Air Act; the Clean Water Restoration Act; the Water Pollution Control Act Amendments of 1956; the Water Quality Act of 1965; the Water Quality Improvement Act of 1970; the Water Pollution Control Act Amendments of 1972; the Water Facilities Act (see Consolidated Farmer's Home Administration Act of 1961); the Watershed Protection and Flood Prevention Act; the Clean Streams Law; the Solid Waste Management Act; the Municipal Waste Planning, Recycling and Waste Reduction Act; A.H.E.R.A; and all rules and regulations thereunder, including but not limited to, those formulated by the United States Environmental Protection Agency, the Maryland Department of the Environment. Nothing contained in the Contract shall be construed as relieving Contractor in any way of Contractor's responsibility for strict compliance with all governmental requirements pertaining to environmental protection.
- B. Nothing contained in the Contract Documents for construction shall be construed by the Contractor as relieving him in any way of his responsibility for strict compliance with the statutes, rules and regulations contained in the above mentioned Environmental Protection Act.

PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 SAFETY REQUIREMENTS

- A. All work shall be performed in accordance with rules, regulations, procedures and safe practices and/or OSHA and all other Government agencies having jurisdiction over the project.
- B. MARYLAND OCCUPATIONAL SAFETY & HEALTH (MOSH) REQUIREMENTS All contracts with the BOARD OF EDUCATION OF PRINCE GEORGE'S COUNTY shall be governed by the STATE OF MARYLAND OCCUPATIONAL SAFETY AND HEALTH (MOSH) LAWS. Where any difference(s) may exist between any particular MOSH standard(s) and the corresponding, related United States Occupational Safety and Health Administration (OSHA) standard(s), MOSH LAW SHALL TAKE PRECEDENCE.
 - 1. Information pertaining to any particular MOSH Law(s) may be obtained from: STATE OF MARYLAND DEPARTMENT OF LICENSING AND REGULATION Division of Labor and Industry/Maryland Occupational Safety and Health 1100 North Eutaw Street Baltimore, Maryland 21202 Telephone No.: 410-767-2215

3.2 SAFETY PRECAUTIONS AND PROGRAMS:

- A. Each Contractor shall be responsible for initiating, maintaining and supervising safety precautions and programs in connection with the work.
- B. All Contractors shall comply with the provisions of the "Occupational Safety and Health Act" and Federal, State and local requirements.
- C. If a Contractor fails to maintain the safety precautions required by law or directed by authorities having jurisdiction, the Owner may take such action as necessary and charge the Contractor therefore. The failure of the Owner to take any such action shall not relieve the Contractor of his obligations.
- D. The Contractor individually shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods and for any damage which may result from their failure or their improper construction, maintenance or operation.

- E. Prior to mobilizing to the job, the Contractor shall submit, in writing, a description of his safety program. During the conduct of the work, the Contractor shall immediately notify the Owner and Architect in writing of all accidents and shall submit a written report describing in detail the circumstances of each accident within 24 hours of its occurrence. All Contractors shall notify the Architect of any flammable, combustible and/or toxic materials intended for use on the project and shall furnish literature pertinent to the use and control of all materials, including, but not limited to M.S.D.S. sheets.
- F. Each Contractor shall delegate one representative who shall be responsible to maintain all safety requirements of the Contractor.

3.3 SAFETY OF PERSONS AND PROPERTY:

- A. The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage or loss to:
 - 1. All school personnel, employees on the work site and all other persons who may be affected thereby.
 - 2. All the work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-Subcontractors.
 - 3. Other property at the site or adjacent thereto, including but not limited to trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction and underground property.
- B. The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority, including the Owner's requirements bearing on the Safety of persons or property or their protection from damage, injury or loss.
- C. The Contractor shall erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including danger signs and other warnings against hazards.
- D. The Contractor shall promptly remedy all damage or loss to any property caused in whole or in part by the Contractor, his Subcontractors, his Sub-Subcontractors, or anyone directly employed by any of them, or by anyone for whose acts any of them be liable.
- E. The Contractor shall not load or permit any part of the work to be loaded so as to endanger its integrity and safety.
- F. Contractors using a method of blasting to perform work on the project shall use all proper methods, including adequate safety matting and/or overburden, progressive time sequences and scaled distances, in accordance with all governmental regulations.
- G. The use of audio equipment and headsets will not be permitted on the construction site.

3.4 PERSONAL PROTECTION REQUIREMENTS

- A. All persons entering the project shall wear hard hats in good condition and meet ANSI 289.11997. Hard hats shall be worn in the proper manner.
- B. All persons entering the project shall wear proper work boots, clothing and attire including long trousers and shirts. No obscene or inappropriate messages may be displayed on clothing. What constitutes
- C. obscene or inappropriate will be at the sole discretion of the Owner.
- D. All job site personnel are expected to strictly adhere to the following rules and regulations:
 - 1. Use of approved eye protection by all Contractor personnel shall be required during all types of percussion and reciprocating work or when other requirements govern.

2. Approved respiratory equipment shall be worn by all personnel exposed to hazardous volumes of toxic or noxious dusts, fumes, mists, or gases
3. Personal protective equipment is to be used under unusual conditions, such as high temperature work, handling caustic or corrosive liquids, or molten metals.
4. The Contractor is responsible for providing safety training to all of his employees.
5. All shipments to the site shall have the required documentation and labels attached and the documentation and labels shall be maintained while the material is on site.
6. As defined in the occupational Safety & Health Act, safety belts, complete with lanyards, or parachute-style harness, complete with lanyard, are to be used where there is a danger of falling.

3.5 HOUSEKEEPING

- A. Materials and equipment must be piled up or stored in a safe manner. Aisles must be kept clear
- B. All drop cables/extension cords shall be elevated above the ground or protected in such a way to allow traffic to pass.
- C. Consumption of food and beverages shall be in designated areas and at specified times.
- D. Glass-bottled refreshments will not be allowed in the workplace.
- E. Welding stubs and shells from explosive activated tools shall be collected and properly disposed of by Contractor.
- F. The cords and connections at temporary panels must be maintained in an orderly fashion at all times to prevent tripping.
- G. Nails are to be bent over and/or removed from wood.
- H. Aisles, stairwells and base areas of ladders are to be kept clear at all times.

3.6 M.S.D.S.-CONTROLLED PRODUCTS

- A. The Contractor is responsible for notifying the Owner, of any controlled products that they bring or cause to have brought onto the site. The Contractor shall submit copies of the Material Safety Data Sheet (M.S.D.S.) for the controlled product, and the Contractor shall retain a copy of the M.S.D.S. on site for their own reference. The legal storage, use, and disposal of any controlled product is the responsibility of the Contractor.
- B. The Contractor shall comply with OSHA Communications' Standards 29 CFR 1910-1200 for hazardous materials. The Contractor shall maintain a Material Safety Data Sheet on file at the jobsite for each chemical brought to the site.
- C. In any emergency affecting the safety or persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss and shall immediately notify the Owner and Architect of such emergency conditions. Any claims made by the Contractor for additional compensation or extension of time on account of emergency work shall be processed in accordance with the Conditions of the Contract.
- D. Temporary storage of hazardous materials shall be the responsibility of the Contractor. Final cleanup and removal shall be by the Contractor.

END OF SECTION

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Temporary telecommunications services.
- B. Temporary telephone service.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.

1.2 RELATED REQUIREMENTS

- A. Section 01 51 00 - Temporary Utilities.
- B. Section 01 52 13 - Field Offices and Sheds.
- C. Section 01 55 00 - Vehicular Access and Parking.
- D. Section 01 3553 - Security Procedures.
- E. Section 01 57 21 - Indoor Air Quality Controls.
- F. Section 01 58 13 - Temporary Project Signage.
- G. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
 - 2. Telephone Land Lines: One line, minimum; one handset per line.
 - 3. Internet Connections: Minimum of one; 3G WiFi access equipment or faster.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.5 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.6 FENCING

- A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.7 EXTERIOR ENCLOSURES

- A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 51 00 - TEMPORARY UTILITIES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Temporary Utilities: Electricity, lighting, heat, and water.

1.2 RELATED REQUIREMENTS

- A. Section 01 50 00 - Temporary Facilities and Controls: Telephone service for administrative purposes.

1.3 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.4 TEMPORARY ELECTRICITY

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.
- D. Provide main service disconnect and over-current protection at convenient location and meter.
- E. Permanent convenience receptacles may be utilized during construction.
- F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.5 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- C. Maintain lighting and provide routine repairs.

1.6 TEMPORARY HEATING

- A. Cost of Energy: By Contractor.
- B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- D. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.7 TEMPORARY COOLING

- A. Cost of Energy: By Contractor.

- B. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.
- C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- D. Prior to operation of permanent equipment for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.8 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 52 13 - FIELD OFFICES AND SHEDS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Temporary field offices for use of Contractor.
- B. Maintenance and removal.

PART 2 PRODUCTS**2.1 MATERIALS, EQUIPMENT, FURNISHINGS**

- A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

2.2 CONSTRUCTION

- A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. Construction: Structurally sound, secure, weather tight enclosures for office. Maintain during progress of Work; remove when no longer needed.
- C. Lighting for Offices: 50 fc at desk top height, exterior lighting at entrance doors.

2.3 ENVIRONMENTAL CONTROL

- A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions.

2.4 CONTRACTOR OFFICE AND FACILITIES

- A. Size: For Contractor's needs and to provide space for project meetings.
- B. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.
- C. Other Furnishings: Contractor's option.
- D. Equipment: Six adjustable band protective helmets for visitors, one 10 inch outdoor weather thermometer .

PART 3 EXECUTION**3.1 PREPARATION**

- A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.2 INSTALLATION

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
- B. Parking: Two hard surfaced parking spaces for use by Owner and Architect, connected to office by hard surfaced walk.

3.3 MAINTENANCE AND CLEANING

- A. Weekly janitorial services for offices; periodic cleaning and maintenance for offices.
- B. Maintain approach walks free of mud, water, and snow.

3.4 REMOVAL

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

END OF SECTION

SECTION 01 55 00 - VEHICULAR ACCESS AND PARKING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Access roads.
- B. Driveways, entrance and traffic routes.
- C. Parking.
- D. Permanent pavements and parking facilities.
- E. Construction parking controls.
- F. Flag persons.
- G. Flares and lights.
- H. Haul routes.
- I. Traffic signs and signals.
- J. Maintenance.
- K. Removal, repair.
- L. Mud from site vehicles.

PART 2 PRODUCTS**2.1 MATERIALS**

- A. Temporary Construction: Contractor's option.
- B. Materials for Permanent Construction: As specified in product specification sections, including earthwork, paving base, and topping.

2.2 SIGNS, SIGNALS, AND DEVICES

- A. Post Mounted and Wall Mounted Traffic Control and Informational Signs: Specified in Section 01 58 13 - Temporary Project Signage.
- B. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
- C. Flag Person Equipment: As required by local jurisdictions.

PART 3 EXECUTION**3.1 PREPARATION**

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

3.2 ACCESS ROADS

- A. Construct new temporary all-weather access roads from public thoroughfares to serve construction area, of a width and load bearing capacity to provide unimpeded traffic for construction purposes.
- B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
- C. Location as approved by Architect.
- D. Provide unimpeded access for emergency vehicles. Maintain 20 foot width driveways with turning space between and around combustible materials.

- E. Provide and maintain access to fire hydrants free of obstructions.

3.3 DRIVEWAYS, ENTRANCE AND TRAFFIC ROUTES

- A. Truck deliveries shall be scheduled so that the streets adjacent to the site do not back up with delivery trucks waiting to deliver materials. Trucks must be scheduled accordingly, or wait to unload inside the fence in the project site or off the Owner's property.

3.4 PARKING

- A. Use of new parking facilities by construction personnel is not permitted.
- B. Do not allow heavy vehicles or construction equipment in parking areas.
- C. Arrange for temporary parking areas to accommodate construction personnel.
- D. When site space is not adequate, provide additional off-site parking.
- E. Locate as approved by Architect.

3.5 PERMANENT PAVEMENTS AND PARKING FACILITIES

- A. Prior to Substantial Completion the base for permanent roads and parking areas may be used for construction traffic.
- B. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.

3.6 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.
- B. Monitor parking of construction personnel's vehicles. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.7 FLAG PERSONS

- A. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.8 FLARES AND LIGHTS

- A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.9 HAUL ROUTES

- A. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

3.10 TRAFFIC SIGNS AND SIGNALS

- A. At approaches to site and on site, install at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
- B. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.
- C. Relocate as work progresses, to maintain effective traffic control.

3.11 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
- B. Maintain new permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.12 REMOVAL, REPAIR

- A. Remove temporary roads when permanent paving is usable.
- B. Remove underground work and compacted materials to a depth of 2 feet; fill and grade site as specified.
- C. Repair new permanent facilities damaged by use, to original condition.
- D. Remove equipment and devices when no longer required.
- E. Repair damage caused by installation.
- F. Remove post settings to a depth of 2 feet.

3.13 MUD FROM SITE VEHICLES

- A. Provide means of removing mud from vehicle wheels before entering streets.

END OF SECTION

SECTION 01 58 13 - TEMPORARY PROJECT SIGNAGE**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Project identification sign.
- B. Project informational signs.

1.2 QUALITY ASSURANCE

- A. Design sign and structure to withstand 50 miles/hr wind velocity.
- B. Sign Painter: Experienced as a professional sign painter for minimum three years.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawing: Show content, layout, lettering, color, foundation, structure, sizes and grades of members.

PART 2 PRODUCTS**2.1 SIGN MATERIALS**

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch thick, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized.
- D. Paint and Primers: Exterior quality, two coats; sign background of color as selected.
- E. Lettering: Exterior quality paint, contrasting colors.

2.2 PROJECT IDENTIFICATION SIGN

- A. One painted sign of construction, design, and content indicated on drawings, location designated.
- B. Content:
 - 1. Project number, title, logo and name of Owner as indicated on Contract Documents.
 - 2. Names and titles of authorities.
 - 3. Names and titles of Architect and Consultants.
 - 4. Name of Prime Contractor and major Subcontractors.
- C. PGCPs has directive on how to execute the signage for all types of project. This documentation is attached to this section.

2.3 PROJECT INFORMATIONAL SIGNS

- A. Painted informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering to provide legibility at 100 foot distance.
- B. Provide at each field office, storage shed, and directional signs to direct traffic into and within site. Relocate as Work progress requires.
- C. Provide signs designation construction access at entrances designated for construction access.

- D. Provide no trespassing and hard hat area signs.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install project identification sign within 30 days after date fixed by Notice to Proceed.
- B. Erect at designated location.
- C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- D. Install sign surface plumb and level, with butt joints. Anchor securely.
- E. Paint exposed surfaces of sign, supports, and framing.

3.2 MAINTENANCE

- A. Maintain signs and supports clean, repair deterioration and damage.

3.3 REMOVAL

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

END OF SECTION

INTERAGENCY COMMISSION ON SCHOOL CONSTRUCTION



LARRY HOGAN
GOVERNOR

KAREN B. SALMON, Ph.D.
CHAIRPERSON

ROBERT A. GORRELL
EXECUTIVE DIRECTOR

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MEMORANDUM

TO: All Directors of Facility Planning

FROM: Robert A. Gorrell, Executive Director

RAG

DATE: February 3, 2020

RE: Revision for Construction Sign

Each State funded school construction project shall have a construction sign on the site and a plaque for installation in the school as identified in Appendix E of the IAC/PSCP Administrative Procedures Guide (APG).

On January 8, 2020, Senate President Bill Ferguson was sworn in as the 86th President of the Maryland Senate, resulting in revisions to the construction sign for State funded school construction projects. This revised sign is available through Maryland Correctional Enterprises (MCE) and should be used for State funded school construction projects.

The construction sign should be erected for all State funded school construction projects including all systemic renovation projects, with the exception of Aging School Program (ASP) and Qualified Zone Academy Bond (QZAB) projects less than \$100,000 and State-owned and locally-owned relocatable classroom building projects. This policy is consistent with the requirements of the IAC [Administrative Procedures Guide \(APG\)](#).

Please ensure that the new layout is followed exactly as sent to you, including the same slogan, names, colors, justification, size of lettering, etc. It is strongly recommended that construction signs be purchased through MCE.

MCE can be reached at:

Maryland Correctional Enterprises (MCE) Sign Plant #111

C/O Patuxent Institution

Attention: Charles Behnke, Plant Manager

7555 Waterloo Road Jessup, MD 20794

410-799-5102 - FAX: 410-799-7911

charles.behnke@maryland.gov

www.mce.md.gov

Please reference the enclosed revised sign template until the Administrative Procedures Guide is updated with the revised information and review this information with your project architects, contractors and consultants.

If you have any questions regarding this matter, please contact Jay Schulte at Jay.Schulte@maryland.gov or (410) 767-0610.

96 in



Larry Hogan, Governor
Boyd Rutherford, Lt. Governor

Building Bright

Futures in Maryland

The State of Maryland and the (Name of County) **Board of Education are:**
(Name of Project)

at the
(Name of School)

Public School Construction Program

Architect: (Name of Architect)

Contractor: (Name of Contractor)

72 in

The Maryland General Assembly

Adrienne A. Jones, Speaker of the House
Bill Ferguson, President of the Senate

Board of Public Works

Larry Hogan, Governor
Peter Franchot, Comptroller
Nancy K. Kopp, Treasurer

SECTION 01 60 00 - PRODUCT REQUIREMENTS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. General product requirements.
- B. Sustainable design-related product requirements.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 REFERENCE STANDARDS

- A. ASTM D6866 - Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis; 2016.
- B. C2C (DIR) - C2C Certified Products Registry; Cradle to Cradle Products Innovation Institute; www.c2ccertified.org/products/registry.
- C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; 2017, v1.2.
- D. International Organization for Standardization document, ISO 14021 - Environmental Labels and Declarations - Self-declared Environmental Claims (Type II Environmental Labeling).
- E. EN 15804 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products; 2013.
- F. GreenScreen (LIST) - GreenScreen for Safer Chemicals List Translator; Clean Production Action; www.greenscreenchemicals.org.
- G. GreenScreen (METH) - GreenScreen for Safer Chemicals Method v1.2; Clean Production Action; www.greenscreenchemicals.org.
- H. ISO 14025 - Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures; 2006.
- I. ISO 14040 - Environmental management -- Life cycle assessment -- Principles and framework; 2006.
- J. ISO 14044 - Environmental management -- Life cycle assessment -- Requirements and guidelines; 2006.
- K. ISO 21930 - Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services; 2017.

1.3 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit prior to or with second full-month Application for Payment; payment may be withheld until submission of Products List.
 - 2. For products specified only by reference standards, list applicable reference standards.

- B. Comparable Product Request Submittal: Submit request for consideration of each comparable product or system for evaluation by Architect in accordance with submittal procedures specified in this Section for Substitution Requests.
 - 1. Submit Comparable Product requests prior to or with second full-month Application for Payment.
- C. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- F. Sustainable Design Submittals: Items necessary to document use of sustainable construction materials, products, and practices.

1.4 QUALITY ASSURANCE

- A. Bio-Based Content: Of vegetable or animal origin, not including products made by killing the animal.
 - 1. Determine percentage of bio-based content in accordance with ASTM D6866.
 - 2. Bio-based content must be sourced from a Sustainable Agriculture Network certified farm.
- B. CAL (CDPH SM) v1.1: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v. 1.1–2010, for the emissions testing and requirements of products and materials.
- C. Chain-of-Custody (COC): A procedure that tracks a product from the point of harvest or extraction to its end use, including successive stages of processing, transformation, manufacturing, and distribution.
- D. Chain-of-Custody Certificates: Certificates signed by manufacturers and fabricators certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.
- E. Composite Wood and Agrifiber: Products made of wood particles and/or plant material pressed and bonded with adhesive or resin such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores.
- F. Corporate Sustainability Report: A third-party verified report that outlines the environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain.
- G. Cradle-to-Cradle Certified: End use product certified Cradle-to-Cradle v2 Basic or Cradle-to-Cradle v3 Bronze, minimum, as evidenced by C2C (DIR).
- H. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.
 - 1. Good: Product-specific; compliant with ISO 14044.
 - 2. Better: Industry-wide, generic; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.

3. Best: Commercial-product-specific; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
 4. Where demonstration of impact reduction below industry average is required, submit both industry-wide and commercial-product-specific declarations; or submit at least 5 declarations for products of the same type by other manufacturers in the same industry.
- I. GreenScreen Chemical Hazard Analysis: Ingredients of 100 parts-per-million or greater evaluated using GreenScreen (METH).
 1. Good: GreenScreen (LIST) evaluation to identify Benchmark 1 hazards; a Health Product Declaration includes this information.
 2. Better: GreenScreen Full Assessment.
 3. Best: GreenScreen Full Assessment by GreenScreen Licensed Profiler.
 4. Acceptable Evidence: GreenScreen report.
 - J. Health Product Declarations (HPD): Complete, published declaration with full disclosure of known hazards, prepared using one of the HPDC (HPD-OLT) online tools.
 - K. Leadership Extraction Practices: Products that meet at least one of the responsible extraction criteria, which include: extended producer responsibility; bio-based materials; FSC wood products; materials reuse; recycled content; and other programs approved by sustainability certification system used for the project.
 - L. Manufacturer's Inventory of Product Content: Publicly available inventory of every ingredient identified by name and Chemical Abstract Service Registration Number (CAS RN).
 1. For ingredients considered a trade secret or intellectual property, the name and CAS RN may be omitted, provided the ingredient's role, amount, and GreenScreen Benchmark are given.
 - M. Multi-Attribute Certifications: Lifecycle-based environmental certifications that indicate that a product has undergone rigorous scientific testing, exhaustive auditing, or both, to prove its compliance with stringent, third-party, environmental performance standards.
 - N. Rapidly Renewable Materials: Made from agricultural products that are typically harvested within a 10-year or shorter cycle.
 - O. Recycled Content: Determine percentage of post-consumer and pre-consumer (post-industrial) content separately, using the guidelines contained in 16 CFR 260.13.
 1. Previously used, reused, refurbished, and salvaged products are not considered recycled.
 2. Wood fabricated from timber abandoned in transit to original mill is considered reused, not recycled.
 3. Determine percentage of recycled content of any item by dividing the weight of recycled content in the item by the total weight of materials in the item.
 4. Determine value of recycled content of each item separately, by multiplying the content percentage by the value of the item.
 5. Acceptable Evidence:
 - a. For percentage of recycled content, information from manufacturer.
 - b. For cost, Contractor's cost data.
 - P. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 100 miles from the Project site.
 - Q. Source Location: Location of harvest, extraction, recovery, or manufacture; where information about source location is required to be submitted, give the postal address:
 1. In every case, indicate the location of final assembly.
 2. For harvested products, indicate location of harvest.

3. For extracted (i.e. mined) products, indicate location of extraction.
 4. For recovered products, indicate location of recovery.
 5. For products involving multiple manufacturing steps, provide a description of the process at each step, with location.
 6. Acceptable Evidence:
 - a. Manufacturer's certification.
 - b. Life cycle analysis (LCA) performed by third-party.
- R. Sustainably Harvested Wood: Solid wood, wood chips, and wood fiber certified or labeled by an organization accredited by one of the following:
1. The Forest Stewardship Council, The Principles for Natural Forest Management; for Canada visit <http://www.fsccanada.org>, for the USA visit <http://www.fscus.org>.
 2. Sustainable Forestry Board, under The Sustainable Forestry Initiative® of the American Forest & Paper Association; refer to <http://www.afandpa.org>.
 3. Acceptable Evidence: Copies of invoices bearing the certifying organization's certification numbers.

1.5 SUBSTITUTIONS DURING PROCUREMENT

- A. Where the Bid Documents stipulate manufacturers with or without named products, substitutions will be considered up to 10 days before receipt of bids.
- B. Submit substitution requests by completing the form following this Section; use only this form - other forms of submission are unacceptable.
- C. Prior to Bid: Architect will list approved substitutions in an Addendum.
- D. Bidders to include in their bid all changes required in the work and changes to Contract Sum to accommodate accepted substitutions, on bidder's decision to use accepted substitutions. A later claim by the bidder for an addition to the Contract Time or Contract Sum because of changes in work necessitated by use of substitutions shall not be considered.
- E. The submission shall provide information required by this Section, to determine acceptability of such products.
- F. Provide products as specified unless substitutions are submitted in this manner and accepted.

PART 2 PRODUCTS

2.1 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 1. Made of wood from newly cut old growth timber.
 2. Containing lead, cadmium, or asbestos.
- C. Where other criteria are met, Contractor shall give preference to products that:
 1. Are extracted, harvested, and/or manufactured closer to the location of the project.
 2. Have longer documented life span under normal use.
 3. Result in less construction waste. See Section 01 74 19
 4. Are made of vegetable materials that are rapidly renewable.
 5. Are made of recycled materials.
 6. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.
 7. If bio-based, other than wood, are or are made of Sustainable Agriculture Network certified products.
 8. Are Cradle-to-Cradle Certified.
 9. Have a published Environmental Product Declaration (EPD).

10. Have a published Health Product Declaration (HPD).
 11. Have a published GreenScreen Chemical Hazard Analysis.
 12. Have a published Manufacturer's Inventory of Chemical Content.
- D. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
- E. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

2.2 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products of Named Manufacturers: Contractor to provide products from named manufacturers; refer to other provisions regarding substitutions.
- C. Named Products: Products identified by manufacturer, make or model number or other designation shown or listed in manufacturer's published product literature.
- D. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating Comparable Product of other named manufacturers.
1. Where other named manufacturers included acceptable product for performance, Contractor must coordinate modifications due to sizing or engineering differences with associated trade contractors.
- E. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
1. Comparable Products include:
 - a. Product of manufacturer listed without identified product; either with or without Basis-of-Design product identified in the Section.
 - b. Product of manufacturer other than manufacturer/product listed and followed with "or equal," "or approved equal," or similar phrase.
 2. Contractor is responsible for costs associated with the use of Comparable Products, including coordination and modification with other trade contractors related to selection of Comparable Product.

3. Use of Comparable Product must not require changes to the building design or engineering; use must not require additional inspection or testing fees to be paid by the Owner.
- F. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

2.3 MAINTENANCE MATERIALS

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

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 01 25 00 - Substitution Procedures.
- B. Timing: Architect will not consider requests for substitution, after defined time period under Part 1 of this Section, except for extenuating circumstances described below; requests may be considered or rejected at discretion of Architect.
 1. The product is no longer manufactured.
 2. The product is not available due to a strike.
 3. The specified product is identified as incompatible or inappropriate for the project.
 4. The specified item fails to comply with building code requirements.
 5. The manufacturer or fabricator declares a specified product to be unsuitable for the use intended and refuses to warrant its installation, and where the Contractor certifies that the proposed substitution provides the required warranty.
 6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents, as attachments to the Substitution Request Form.
 1. Statement indicating why specified material or product cannot be provided.
 2. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 3. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 5. Samples, where applicable or requested.
 6. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 7. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 8. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

9. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 10. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 11. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 12. After Bidding:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Cost savings offered to the Owner; proposed substitutions without a cost benefit to the Owner will not be considered.
- D. A request for substitution constitutes a representation that the submitter:
1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, including sustainability attributes required by LEED.
 2. Will provide the same warranty for the substitution as for the specified product.
 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
 6. Where a proposed substitution involves more than one Contractor, each Contractor shall cooperate with the other Contractors involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of products.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
1. Substitution Request Form: Use Grimm and Parker form attached to this Section.
 2. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
 3. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 4. Architect will consider Contractor's request for substitution when the following conditions are met. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Substitution requested must meet or exceed specified material, product or equipment items appearance, function and quality level as determined by the Architect and Owner.
 - b. Requests for substitution must include clear identification of the material, product or equipment item and complete description including drawings, cuts, performance and test data, along with any other information necessary for a complete evaluation.
 - c. Requested substitution shall not require extensive revisions to the Contract Documents or changes to any other materials, products or equipment items.
 - d. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - e. Substitution request is fully documented and properly submitted.

- f. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - g. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - h. Requested substitution is compatible with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. Requested substitution will not delay the Work.
 - k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - l. The Architect's/Owner's decision to accept or reject the proposed substitution shall be final and will be set forth in writing.
- G. Architect's Action: Architect's notification of acceptance will be in the following forms:
1. During Bidding: Indicated within an Addendum.
 2. After Contract signing: Change Order.
 3. Use product specified if Architect cannot make a decision on use of a proposed substitution due to incomplete documentation.
 4. Absence of request for additional information or mention within Addenda it to be interpreted as rejection of proposed substitution.

3.2 OWNER-SUPPLIED PRODUCTS

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

3.3 TRANSPORTATION AND HANDLING

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

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

3.4 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- J. Prevent contact with material that may cause corrosion, discoloration, or staining.
- K. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- L. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION



Substitution Request Form

IDENTIFICATION:

Contractor/CM: _____

Project Name: _____

Date: _____

REFERENCE:

Specification Title: _____

Specification No.: _____ Page: _____ Article/ Paragraph: _____

DESCRIPTION:

Proposed Substitution: _____

Manufacturer: _____

History: New Product 2-5 years old 5-10 years old More than 10 years old

Reason for requesting substitution: Cause Convenience

Explain: _____

Differences between proposed substitution and specified item: _____

(Use attachment for additional space, if required.)

Proposed substitution affects other parts of Work or applicable Code requirements as follows: _____

(Use attachment for additional space, if required.)

Post-Bid Savings to Owner for accepting substitution: (N/A Pre-Bid) _____

Change to Contract Time due to accepting substitution: _____

LEED Contribution (if applicable to Project) - Explain effects to LEED Action Plan: _____

(Use attachment for additional space, if required.)

Will undersigned pay any costs caused by the substitution necessitating changes to the building design, construction, engineering and detailing, including additional Architect, inspection and testing fees? Yes No

Does the undersigned waive rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results? Yes No

Submitted by: _____
(Contractor or CM Only)

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

SUPPORTING DATA ATTACHED:

Point-by-Point Comparative Data Attached (Required)

Drawings Product Data Samples Tests Reports _____

CERTIFICATION:

The Undersigned certifies:

- Proposed substitution has been investigated and determined that it meets or exceeds the quality level of the specified product.
- Same warranty will be furnished for proposed substitution as for specified product; **provide attachment if different.**
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances; **provide attachment if otherwise.**
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.
- Neither the Owner and Architect will be liable for license fees or royalties.

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SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
 - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
 - 6. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work and products to be used.
 - e. Alternatives to cutting and patching.
 - f. Effect on work of Owner or separate Contractor.
 - g. Written permission of affected separate Contractor.
 - h. Date and time work will be executed.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.4 QUALIFICATIONS

- A. For surveying work, employ a land surveyor registered in the State of Maryland and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities.

- B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State of Maryland. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

1.5 PROJECT CONDITIONS

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- C. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- D. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- E. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- F. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- G. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work,

assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
 - 3. Review conflicts and compatibility issues.
 - 4. Review environmental limitations and protection.
 - 5. Examine substrates.
 - 6. Review requirements of the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Submittals.
 - e. Mockups.
 - f. Testing and inspection.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.

- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

3.5 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.6 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- C. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.
- J. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.

3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- K. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- L. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

3.7 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.8 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.9 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.11 FINAL CLEANING

- A. Employ experienced workers or professional cleaners for final cleaning; clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program.
- B. Use cleaning materials that are nonhazardous.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- E. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
- F. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
- G. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
- H. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
- I. Remove tools, construction equipment, machinery, and surplus material from Project site.
- J. Remove snow and ice to provide safe access to building.
- K. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- L. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- M. Sweep concrete floors broom clean in unoccupied spaces.
- N. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
- O. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
- P. Remove labels that are not permanent.
- Q. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
- R. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- S. Replace parts subject to unusual operating conditions.

- T. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- U. Clean exposed surfaces of diffusers, registers, and grills.
- V. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- W. Leave Project clean and ready for occupancy.

END OF SECTION

SECTION 01 71 23 - FIELD ENGINEERING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Field engineering services by Contractor.
- B. Land surveying services by Contractor.

1.2 DESCRIPTION OF SERVICES

- A. Specific services listed in this section are in addition to, and do not supersede, general Execution and Closeout Requirements.
- B. Sole responsibility for establishing all locations, dimensions and levels of items of work.
- C. Sole responsibility for provision of all materials required to establish and maintain benchmarks and control points, including batter boards, grade stakes, structure elevation stakes, and other items.
- D. Keeping a transit, theodolite, or TST (total station theodolite with electronic distance measurement device); leveling instrument; and related implements such as survey rods and other measurement devices, at the project site at all times.
- E. Provision of facilities and assistance necessary for Architect to check lines and grade points placed by Contractor.
 - 1. Performance of excavation or embankment work until after all cross-sectioning necessary for determining payment quantities for Unit Price work have been completed and accepted by Architect.
- F. Preparation and maintenance of daily reports of activity on the work. Submission of reports containing key progress indicators and job conditions to Architect.
 - 1. Major equipment and materials installed as part of the work.
 - 2. Location of areas in which construction was performed.
 - 3. Work performed, including field quality control measures and testing.
 - 4. Weather conditions.
 - 5. Instructions received from Architect or Owner, if any.
- G. Preparation and maintenance of professional-quality, accurate, well organized, legible notes of all measurements and calculations made while surveying and laying out the work.
- H. Prior to backfilling operations, surveying - locating, and recording on a copy of the Contract Documents - an accurate representation of buried work and Underground Facilities encountered.

1.3 REFERENCE STANDARDS

- A. FGDC-STD-007.1 - Geospatial Positioning Accuracy Standards - Part 1: Reporting Methodology; 1998.
- B. FGDC-STD-007.2 - Geospatial Positioning Accuracy Standards - Part 2: Standards for Geodetic Networks; 1998.
- C. FGDC-STD-007.4 - Geospatial Positioning Accuracy Standards - Part 4: Architecture, Engineering, Construction, and Facilities Measurement; 2002.
- D. State Plane Coordinate System for the State of Maryland.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Submit in addition to items required in Section 01 70 00 - Execution and Closeout Requirements.
- C. Informational Submittals: Submit the following:
 - 1. Field Engineering: Submit daily reports, with content as indicated in this section.
 - 2. Final property survey.

1.6 QUALITY ASSURANCE

- A. Field Engineer's Qualifications: As established in Section 01 70 00 - Execution and Closeout Requirements.
- B. Land Surveyor's Qualifications: As established in Section 01 70 00 - Execution and Closeout Requirements.
- C. Use adequate number of skilled and thoroughly-trained workers to perform the work of this section in a timely and comprehensive manner.
- D. Minimum accuracy for required work is as follows:
 - 1. Grade: Horizontal Tolerance: Plus or minus 0.5 feet, Vertical Tolerance: Plus or minus 0.05 feet.
 - 2. Culverts and ditches: Horizontal Tolerance: Plus or minus 0.5 feet, Vertical Tolerance: Plus or minus 0.05 feet.
 - 3. Structures: Horizontal Tolerance: Plus or minus 0.5 feet (location), Vertical Tolerance: Plus or minus 0.05 feet.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. Notify Owner's Representative and Architect of any discrepancies immediately in writing before proceeding to lay out the work. Locate and protect existing benchmarks and base line. Preserve permanent reference points during construction.
- B. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify existing conditions.

3.2 FIELD ENGINEERING

- A. Maintain field office files, drawings, specifications, and record documents.
- B. Coordinate field engineering services with Contractor's subcontractors, installers, and suppliers as appropriate.
- C. Prepare layout and coordination drawings for construction operations.
- D. Check and coordinate the work for conflicts and interferences, and immediately advise Architect and Owner of all discrepancies of which Contractor is aware.

- E. Cooperate as required with Architect and Owner in observing the work and performing field inspections.
- F. Review and coordinate work on a regular basis with shop drawings and Contractor's other submittals.
- G. Check the location, line and grade of every major element as the work progresses. Notify the Architect when deviations from required lines or grades exceed allowable tolerances. Include in such notifications a thorough explanation of the problem, and a proposed plan and schedule for remedying the deviation. Do not proceed with remedial work without Owner's concurrence of the remediation plan.
- H. Check all formwork, reinforcing, inserts, structural steel, bolts, sleeves, piping, other materials and equipment for compliance with shop drawings and Contract Documents requirements.
- I. Check all bracing and shoring for structural integrity and compliance with designs prepared by the Contractor.

3.3 LAND SURVEYING

- A. General: Follow standards for geospatial positioning accuracy.
 - 1. FGDC-STD-007.1 as amended by Authority Having Jurisdiction.
 - 2. FGDC-STD-007.2 as amended by Authority Having Jurisdiction.
 - 3. FGDC-STD-007.4 as amended by Authority Having Jurisdiction.
- B. Coordinate survey data with the State Plane Coordinate System of the State of Maryland.
- C. Contractor is responsible for the restoration of all property corners and control monuments damaged or destroyed by construction-related activities. Any disturbed monuments must be replaced at Contractor's expense by a surveyor licensed in the State of Maryland, and approved by the Architect.
 - 1. Temporarily suspend work at such points and for such reasonable times as the Owner may require for resetting monuments. The Contractor will not be entitled to any additional compensation or extension of time.

3.4 CONSTRUCTION SURVEYING

- A. General: Perform surveying as applicable to specific items necessary for proper execution of work.
 - 1. Alignment Staking: Provide alignment stakes at 50 foot intervals on tangent, and at 25 foot intervals on curves.
 - 2. Slope Staking: Provide slope staking at 50 foot intervals on tangent, and at 25 foot intervals on curves. Re-stake at every ten-foot difference in elevation.
 - 3. Structure: Stake out structures, including elevations, and check prior to and during construction.
 - 4. Pipelines: Stake out pipelines including elevations, and check prior to and during construction.
 - 5. Site Utilities: Stake out utility lines including elevations, and check prior to and during construction.
 - 6. Cross-sections: Provide original, intermediate, and final staking as required, for site work and other locations as necessary for quantity surveys.
 - 7. Easement Staking: Provide easement staking at 50 foot intervals on tangent, and at 25 foot intervals on curves. If required by project conditions, provide wooden laths with flagging at 100 foot intervals.

8. Record Staking: Provide permanent stake at each blind flange and each utility cap is provided for future connections. Use stakes for record staking of material(s) acceptable to Architect.
 9. Structural Frame: Upon completion, certify location and plumbness.
- B. Record Log: Maintain a log of layout control work. Record any deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used.
- C. Accuracy:
1. Establish Contractor's temporary survey references points for Contractor's use to at least second-order accuracy (e.g., 1:10000). Set construction staking used as a guide for the work to at least third-order accuracy (e.g., 1:5000). Provide the absolute margin for error specified below on the basis established by such orders.
 - a. Horizontal accuracy of easement staking: Plus or minus 0.1 feet.
 - b. Accuracy of other staking shall be plus or minus 0.04 feet horizontally and plus or minus 0.02 feet vertically.
 - c. Include an error analysis sufficient to demonstrate required accuracy in survey calculations.
 2. Owner reserves the right to check the Contractor's survey, measurements, and calculations. The requirement for accuracy will not be waived, whether this right is exercised or not.

3.5 SUPPORT AND BRACING

- A. General requirements: Design all support and bracing systems, if required. Provide for attachment to portions of the building structure capable of bearing the loads imposed. Design systems to not overstress the building structure.

3.6 REPORTS

- A. Submit two copies of Contractor's daily reports at Architect's field office (or electronically) by 9:00 AM the next working day after the day covered in the associated report. Daily report shall be signed by responsible member of Contractor's staff, such as project manager or superintendent, or foreman designated by Contractor as having authority to sign daily reports.

3.7 RECORDS

- A. Maintain at the Site a complete and accurate log of control and survey work as it progresses.
1. Organize and record survey data in accordance with recognized professional surveying standards, Laws and Regulations, and prevailing standards of practice in the State of Maryland. Record Contractor's surveyor's original field notes, computations, and other surveying data in Contractor-furnished hard-bound field books. Contractor is solely responsible for completeness and accuracy of survey work, and completeness and accuracy of survey records, including field books. Survey records,(including field books) may be rejected by Owner due to failure to organize and maintain survey records in a manner that allows reasonable and independent verification of calculations, and/or allows identification of elevations, dimensions, and grades of the work.
 2. Illegible notes or data, and erasures on any page of field books, are unacceptable. Do not submit copied notes or data. Corrections by ruling or lining out errors will be unacceptable unless initialed by the surveyor. Violation of these requirements may require re-surveying the data questioned by Architect.
- B. Submit three copies of final property survey to Owner. Include on the survey a certification, signed by the surveyor, that principal metes, bounds, lines, and levels of the Project are accurately positioned as shown on the survey. Include the following information:

1. Structure locations from property lines, and distances to adjacent buildings.
2. Dimensions and locations of drives, walks, walls, underground utilities, appurtenances, and major site features.
3. Location of easements.
4. Final grading topographic survey.

3.8 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

END OF SECTION

SECTION 01 74 19 – CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT AND DISPOSAL**PART 1 - GENERAL****1.1 SUMMARY**

- A. Reduce construction and demolition waste on project site and minimize waste sent to landfills and incineration through implementation of a Construction and Demolition Waste Management Plan as required by LEED® v4 Building Design and Construction (LEED BD+C: Schools) Rating System and as outlined within this section. Throughout this section, the term LEED is used in place of LEED BD+C: Schools.
- B. Related sections: The following sections contain requirements that relate to this section:
 - 1. Division 01 Section “Sustainable Design Requirements-LEED” for definitions and reference standards relating to waste management, referenced herein.
 - 2. Division 02 Sections referring to demolition.

1.2 REFERENCES

- A. LEED v4 for Building Design and Construction, with all current addenda.
 - 1. Materials and Resources (MR) Prerequisite 2: Construction and Demolition Waste Management Planning
 - 2. MR Credit 5: Construction and Demolition Waste Management

1.3 PRELIMINARY SUBMITTALS

- A. Prior to any waste removal and within 30 days of Contract award, submit for approval a detailed Waste Management Plan in accordance with LEED MR Prerequisite 2 and Credit 5 requirements and as outlined in this Section.
 - 1. MR Prerequisite 2: Identify at least five materials (both structural and nonstructural) to be targeted for diversion.
 - a. Provide an estimated percentage of the overall project waste that these materials represent, and diversion goals for each.
 - 2. MR Credit 5 Select one of the following additional waste management goals:
 - a. Option 1 - Divert at least 75 percent, of total construction and demolition waste, identifying at least four individual material waste streams, from landfill or incinerator, by weight or volume.
 - 1) Commingled waste is calculated as one material stream unless the sorting facility provides diversion rates for specific materials using weight or volume.
 - b. Option 2 - Reduction of total waste: Limit waste to 2.5 pounds of construction waste per square foot (12.2 kilograms of waste per square meter) of the building's floor area.
 - 3. Describe means and methods to achieve required goal.
 - a. MR Prerequisite 2 and Credit 5 Option 1:
 - 1) Indicate whether materials will be separated on site or comingled.
 - 2) Identify recycling contractors and haulers proposed for the project and locations accepting waste materials or entities providing related services.
 - 3) Describe how the recycling facility will process the material.
 - 4) Comingled sorting facilities: Provide end destination and intended use for diverted materials.
 - a) For multiple waste streams: Provide statement that project specific diversion rates will be provided, by weight or volume.
 - b) For one comingled waste stream: Provide average annual recycling rate for the facility provided by the regulating local or state government authority. Confirm alternative daily cover (ADC) is excluded from the average annual rate.

- c) Visual inspection is not an acceptable method of inspection for purposes of documenting percentage of comingled waste diverted from landfill.
- b. MR Credit 5 Option 2: Describe source reduction strategies.

1.4 INFORMATIONAL SUBMITTALS

- A. With each Application for Payment, submit waste management progress reports, demonstrating MR Credit 5: Construction and Demolition Waste Management.
 - 1. Project title, name of party completing report, and dates of period covered by the report.
 - 2. Option 1: Amount (by weight or volume) of recycled and/or salvaged construction and demolition waste to date, include the identified four material streams.
 - a. Exclude excavated soil, land-clearing waste from calculations.
 - b. Include materials destined for alternative daily cover (ADC) as landfilled waste.
 - c. Include wood waste converted to fuel (biofuel) or waste-to-energy as diverted from landfill in calculations.
 - 1) Exclude all other types of waste-to-energy from calculations.
 - d. Comingling sorting facilities: Provide summary of diversion rates, type of materials recycled and description of the end destination of the recycled materials.
 - 3. Option 2: Calculate waste generated per square foot of building floor area.
 - a. Exclude materials reused on site.
 - b. Include all materials donated, sent to reuse facility or reused off-site.
 - c. Include all materials sent to recycling facilities, landfills and incinerators.

1.5 CLOSEOUT SUBMITTALS

- A. LEED Online: At completion of construction and prior to contract closeout, complete the LEED Online Form to the LEED Online Project Database for MR Prerequisite 2 and Credit 5: Construction and Demolition Waste Management and upload the associated required documentation
 - 1. MR Prerequisite: Construction and Demolition Waste Management Plan and summary of diversion report.
 - 2. For Demolition Phase work performed under separate contract: Include information provided by Owner in MR waste calculations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PLAN IMPLEMENTATION, GENERAL

- A. Training and Coordination:
 - 1. Furnish copies of approved Waste Management Plan to all on-site supervisors, each subcontractor, Owner, and Architect.
 - 2. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all entities at the appropriate stages of the Project.
 - 3. Meetings: Include construction waste management on the agenda of all required regularly scheduled construction meetings.
- B. Facilities: Provide designated facilities for co-mingling or separation and storage of materials for recycling, salvage, reuse, return, donation and waste disposal, per approved Waste Management Plan for use by all contractors and installers.
 - 1. Provide adequate space, convenient to subcontractors, for pick-up and delivery.
 - 2. Keep recycling and waste bin areas neat and clean to avoid contamination of materials.
- C. Records: Maintain on-site logs for each load of materials removed from site:

1. Include type of material, load (by weight or volume), recycling/hauling service, and date accepted by service or non-profit receiver.
 - a. Comingling waste as a single stream: provide documentation of percentages of diverted waste from the sorting facility for the corresponding month.
 - b. Comingled waste as multiple streams: provide documentation of percentages of individual waste streams based on weight or volume.
- D. Methods of waste disposal that are not acceptable for LEED compliance:
 1. Burning or incinerating on or off project site, except as described in PART 1 of this section.
 2. Burying on project site, other than fill.
 3. Dumping or burying on other property, public or private, other than official landfill.
 4. Illegal dumping or burying.
- E. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
 1. MR Credit 3: Building Product Disclosure and Optimization (BPDO) – Sourcing of Raw Materials may contribute to calculations for MR Credit 5 Construction and Demolition Waste Management as part of the waste diversion calculation.
 2. Concrete, masonry and asphalt crushed and reused on-site contribute to MR calculations for Construction and Demolition Waste Management as diverted waste and do not contribute to MR Credit 3: BPDO – Sourcing of Raw Materials as reused materials.
 - a. MR Credit 3: 100 percent recycled content and regional content.
 - b. MR Credit 5: 100 percent diverted from land fill.
 3. Reused materials do not contribute to MR Credit 5: Construction and Demolition Waste Management, Option 2.
- F. Salvage of Materials: Set aside, sort, and protect products to be salvaged for reuse off-site.
- G. Hazardous Waste Handling: Separate, store and dispose of hazardous wastes separately from other materials and in accordance with local regulations.

END OF SECTION

SECTION 01 77 00 - CLOSEOUT PROCEDURES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 20 00 - Payment Procedures.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 1 Section "Price and Payment Procedures."
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use format reviewed and accepted by Owner and Architect.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 78 00 - CLOSEOUT SUBMITTALS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.2 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Record Drawings: Comply with the following:
- C. Number of Copies: Submit copies of record Drawings as follows:
 - 1. Initial Submittal:
 - a. Retain one of first three subparagraphs below.
 - b. Submit record digital data files and one set of plots.
 - 2. Final Submittal:
 - a. Submit record digital data files and three set(s) of record digital data file plots.
- D. Record Specifications: Submit searchable, annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- E. Record Product Data: Submit searchable, annotated PDF electronic files of each Product Data submittal.
 - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.
- F. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit searchable, annotated PDF electronic files and directories of each submittal.
- G. Certification: With each application for payment, provide written certification that Project Record Documents are current at time application is submitted.
- H. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.
- I. Operation and Maintenance Data:
 - 1. Manual Content Submittal: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

- a. Architect will comment on whether content of operations and maintenance submittals are acceptable.
 - b. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
 2. Manual Format: Submit operations and maintenance manuals in the following format:
 - a. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit through Newforma.
 - 1) Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - (a) Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - (b) File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
 - 2) Enable inserted reviewer comments on draft submittals.
 - b. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return two copies.
 3. Initial Manual Submittal: Submit draft copy of each manual at least 90 days calendar days before commencing demonstration and training. Architect or Owner will comment on whether general scope and content of manual are acceptable within 60 calendar days before commencing demonstration and training.
 4. Final Draft Manual Submittal: Submit revised draft copy of each manual that was found unacceptable by Architect or Owner at least 30 calendar days before commencing demonstration and training. Architect or Owner will comment or approve within 15 calendar days before commencing demonstration and training.
- J. Warranties and Bonds:
1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 1. Drawings.

2. Specifications.
 3. Addenda.
 4. Change Orders and other modifications to the Contract.
 5. Reviewed shop drawings, product data, and samples.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
 4. Format: Submit record Specifications as searchable, annotated PDF electronic file.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction.
1. Record Prints:
 - a. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up Record Prints.
 - 1) Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - 2) Accurately record information in an understandable drawing technique.
 - 3) Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 4) Cross-reference record prints to corresponding archive photographic documentation.
 - b. Content: Types of items requiring marking include, but are not limited to, the following:
 - 1) Dimensional changes to Drawings.
 - 2) Revisions to details shown on Drawings.
 - 3) Depths of foundations below first floor.
 - 4) Locations and depths of underground utilities referenced to permanent surface improvements.
 - 5) Revisions to routing of piping and conduits.
 - 6) Revisions to electrical circuitry.
 - 7) Actual equipment locations.
 - 8) Duct size and routing.
 - 9) Locations of concealed internal utilities referenced to visible and accessible features of the structure.
 - 10) Changes made by addendum.
 - 11) Changes made by Change Order or Construction Change Directive.
 - 12) Changes made following Architect's written orders.
 - 13) Details not on the original Contract Drawings.
 - 14) Field records for variable and concealed conditions.
 - 15) Record information on the Work that is shown only schematically.
 - c. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are

- marked, show cross-reference on the Contract Drawings. Use personnel proficient at recording graphic information in production of marked-up record prints.
- d. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - e. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - f. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
2. Record Digital File: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of digital data files of the Contract Drawings, as follows:
 - a. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 - b. Format: Annotated PDF electronic file annotated text, optical character recognition (OCR) searchable, PDF electronic files with comment function enabled.
 - c. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
 - d. Refer instances of uncertainty to Architect for resolution.
 3. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
 - a. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 - b. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
 4. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - a. Record Prints: Organize Record Prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - b. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 - c. Identification: As follows:
 - 1) Project name.
 - 2) Date.
 - 3) Designation "PROJECT RECORD DRAWINGS."
 - 4) Name of Architect.
 - 5) Name of Contractor.
- G. Product Record Data: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. If possible, a Change Order proposal should include resubmitting updated Product Data. This eliminates the need to mark up the previous submittal.

4. Note related Change Orders, Record Specifications, and Record Drawings where applicable.
 5. Format: Submit record Product Data as searchable, annotated PDF electronic file.
 - a. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.
- H. Miscellaneous Record Submittals:
1. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
 2. Format: Submit miscellaneous record submittals as PDF electronic file.
 - a. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

3.2 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
 1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

3.3 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.4 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.5 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - 1. Include HVAC outdoor and exhaust air damper calibration strategy.
 - a. Include provisions which ensure that full closure of dampers can be achieved.
 - 2. Include Carbon Dioxide Monitoring Protocol.
 - 3. Include Carbon Monoxide Monitoring Protocol.
 - 4. Include Frost Mitigation Strategy for ventilation heat-recovery system.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O. Include test and balancing reports.
- P. Lamp Submittal: Include data on all lamps labeled according to fixture type; this data shall include:

1. Manufacturer.
2. Lamp designation (ex. PAR38, M16, T5HO).
3. Manufacturer's catalog number.
4. Wattage.
5. Color temperature.
6. CRI.
7. Beam spread.
8. Initial lumens.
9. Catalog spec sheet for each fixture type.

Q. Additional Requirements: As specified in individual product specification sections.

3.6 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS - GENERAL

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- D. Prepare data in the form of an instructional manual.
- E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 1. Project Directory.
 2. Table of Contents, of all volumes, and of this volume.
 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.
- K. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- L. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume. Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
- M. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- N. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- O. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 1. System, subsystem, and equipment descriptions.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- P. Descriptions: Include the following:
 1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- Q. Operating Procedures: Include the following, as applicable:
 1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.

8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- R. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- S. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

3.7 PRODUCT MAINTENANCE MANUAL

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

3.8 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

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

3.9 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. General:
1. Execute and provide notarized Project Warranty on form furnished by Owner.
 2. Provide special written warranties or guarantees or both for products, equipment, systems, and installations required by other sections of Contract Documents for duration indicated.
 3. Provide manufacturer's warranties or guarantees or both for products, equipment, systems, and installations required by other sections of Contract Documents for duration indicated.
 4. Where manufacturer's warranties or guarantees, or both expire before duration required by other sections of Contract Documents, obtain and pay for extensions as a part of Contract Price.
 5. Provide all warranties or guarantees or both prior to Final Payment.
 6. Warranties or guarantees or both required by Contract Documents shall commence on date of Substantial Completion of work, or designated portion thereof, unless otherwise indicated in Certificate of Substantial Completion.

- C. Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
- D. Include procedures to follow to ensure Warranties are not voided due to maintenance and operational activities,
- E. Include procedures required to initiate warranty claims.
- F. Provide special written warranties, manufacturer's warranties, and/or guarantees for products, equipment, systems, and installation which are required by other sections of Contract Documents for the duration indicated.
- G. Warranties and guarantees shall commence on the date of Substantial Completion of work, or designated portion of work thereof, unless otherwise indicated in Certificate of Substantial Completion.
- H. If Contractor cannot warrant and/or guarantee any portion of work using products or construction methods indicated in the Contract Documents, notify Architect and Owner in writing during bid period and before contracts are awarded.
 - 1. Indicate product or work name(s) and the reasoning to support claim.
 - 2. Provide names of products, method, and/or data on which substitutions can be warranted and/or guaranteed.
 - 3. Should Contractor fail to notify Architect, Contractor will be considered as having agreed to warrant and/or guarantee the work indicated.
- I. Provide a fully executed and notarized Project Warranty. Owner Standard Document shall be provided.

END OF SECTION

SECTION 01 79 00 - DEMONSTRATION AND TRAINING**PART 1 GENERAL****1.1 SUMMARY**

- A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections; comply with pertinent LEED requirements.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Plumbing equipment.
 - 4. Electrical systems and equipment.
 - 5. Security and audio visual systems.
 - 6. Items specified in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
 - 2. Finishes, including flooring, wall finishes, ceiling finishes.
 - 3. Fixtures and fittings.
 - 4. Items specified in individual product Sections.

1.2 SUBMITTALS

- A. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
 - 1. Format: DVD Disc.
 - 2. Label each disc and container with session identification and date.

1.3 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED**PART 3 EXECUTION****3.1 DEMONSTRATION - GENERAL**

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C. Demonstration may be combined with Owner personnel training if applicable.
- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
 - F. Coordinate demonstration and training requirements with commissioning requirements.

END OF SECTION

SECTION 01 81 13 - SUSTAINABLE DESIGN REQUIREMENTS - LEED**PART 1 - GENERAL****1.1 SUMMARY**

- A. This project is designed to achieve all Prerequisites and no less than 50 points under the US Green Building Council's LEED® v4 for Building Design and Construction (LEED BD+C: Schools) Rating System for at least a LEED Silver-level rating. Throughout this section, the term LEED is used in place of LEED BD+C: Schools.
 - 1. Certain LEED prerequisites and credits needed to obtain LEED certification are dependent on material selections. Compliance with LEED prerequisites and credits is a basis for evaluation of substitution requests.
 - 2. Additional LEED prerequisites and credits needed to obtain indicated LEED certification are dependent on Architect's design and other aspects of the Project that are not part of the Work of Contract.
- B. Refer to LEED Scorecard accompanying this Section for LEED Prerequisites and Credits pursued for this project.
- C. LEED has no published numbering system. This project manual imposes a numbering system based on that created by LEEDUser®. This numbering system is indicated on the LEED Scorecard and utilized throughout these specifications.
- D. Contractor is responsible for all requirements of LEED Prerequisites and Credits that are contained throughout these specifications.
- E. Contractor is not responsible for the application for LEED certification.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Division 01 Section "Construction and Demolition Waste Management and Disposal" for detailed LEED requirements to be incorporated into construction process.
- B. Division 01 Section "General Commissioning Requirements" for detailed commissioning requirements.

1.3 REFERENCES

- A. Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standard 885-2008
- B. American National Standards Institute (ANSI) Standard S12.60-2010, Part 1, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools
- C. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 2011 HVAC Applications Handbook, Chapter 48, Noise and Vibration Control
- D. ASHRAE Standard 52.2-2007: Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size
- E. ASHRAE 62.1-2010, Sections 4-7, Ventilation for Acceptable Indoor Air Quality
- F. ASHRAE/IESNA 90.1-2010 Final Qualitative Determination
- G. American Society for Testing and Materials (ASTM) E1527-05, Phase I Environmental Site Assessment
- H. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Indoor Air Quality Guidelines for Occupied Buildings under Construction, 2nd Edition, 2007, ANSI-SMACNA 008-2008, Chapter 3
- I. South Coast Air Quality Management District (SCAQMD) Rule #1113: "Architectural Coatings"
- J. US EPA Construction General Permit (CGP) 2012

- K. US EPA WaterSense Label and WaterSense Water Budget Tool
- L. US EPA ENERGY STAR Program
- M. United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Green Building Rating System:
 - 1. LEED version 4 (LEED v4) for Building Design and Construction (BD+C), with all current addenda

1.4 DEFINITIONS

- A. **COMMINGLED WASTE:** Construction and demolition waste streams combined on-site and sorted off-site into recyclable streams. Also known as single-stream recycling.
- B. **CONSTRUCTION WASTE:** Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition.
- C. **GREEN BUSINESS CERTIFICATION INSTITUTE (GBCI):** Entity providing third-party project LEED certification and professional credentials recognizing excellence in green building performance and practice in support of the USGBC.
- D. **LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED):** A voluntary green building rating system created and managed by the US Green Building Council (USGBC).
- E. **LEED ONLINE:** GBCI project management tool where projects are registered, tracked, and submitted to GBCI for project certification. Information, resources, and support are made available to registered projects. Project team members can upload information to credit forms, submit LEED Interpretation (LI) requests, manage key project details, view and respond to reviewer comments.
- F. **MINIMUM EFFICIENCY REPORTING VALUE (MERV):** Standard method for comparing the efficiency of an air filter, as defined in ASHRAE 52.2-2007. Scale ranges from 1 to 16, which 16 being the most efficient at removing particles from air.
- G. **RECYCLING:** Collection, reprocessing, marketing and use of materials that were recovered or diverted from solid waste stream.
- H. **SALVAGE:** Removal of existing materials or assemblies for re-installation or other use.
- I. **SOLAR REFLECTANCE INDEX (SRI):** Measure of a material's ability to reject solar heat, as shown by a small temperature rise, calculated according to ASTM E1980 using material's Emittance and Reflectivity values. Standard black has an SRI of 0 and standard white has an SRI of 100.
- J. **WASTE:** Extra material or material that has reached end of its useful life in its intended use.

1.5 PRELIMINARY SUBMITTALS

- A. Within 90 days of contract award, based upon the LEED scorecard, submit for approval plans to demonstrate the contractor's approach to the following:
 - 1. Materials and Resources (MR) Prerequisite 2 and Credit 5: Construction and Demolition Waste Management
 - a. Refer to Division 01 Section "Construction and Demolition Waste Management and Disposal."
- B. Within 60 days of contract award, submit qualifications for designated Contractor LEED Coordinator:
 - 1. Option 1 - Demonstrate experience on at least one LEED Certified project.
 - 2. Option 2 - LEED Green Associate or Accredited Professional (AP) with specialty.
- C. Within 60 days prior to building enclosure, submit for approval, a plan or checklist in compliance with EQ Credit 3: Construction Indoor Air Quality (IAQ) Management Plan.

1. Meet or exceed all applicable control measures of Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Indoor Air Quality Guidelines for Occupied Buildings under Construction, 2nd Edition, 2007, ANSI-SMACNA 008-2008, Chapter 3.

1.6 ACTION SUBMITTALS

- A. Contractor is responsible for completion and transmittal of all construction-related documentation required for LEED certification.
 1. Submit for approval information demonstrating LEED compliance.
 2. Highlight or circle pertinent LEED information within each submittal.
 3. Include all applicable LEED Submittal Forms as the first page(s) of the submittal. These forms are provided at the end of this section.
- B. SS Prerequisite 1: Construction Activity Pollution Prevention
 1. Provide periodic inspection reports or date-stamped photographs demonstrating the erosion and sedimentation control plan measures in compliance with the 2012 US Environmental Protection Agency (EPA) Construction General Permit (CGA) or local equivalent.
 - a. Include maintenance activities during construction.
- C. SS Credit 5: Heat Island Reduction
 1. Provide manufacturer product data indicating three-year aged or initial Solar Reflectance (SR) for non-roof materials and three-year aged or initial Solar Reflectance Index (SRI) for roof surface materials.
- D. SS Credit 6: Light Pollution Reduction
 1. Exterior luminaires: Product data indicating backlight, uplight, and glare ratings (BUG).
- E. WE Prerequisite 2 and Credit 2: Indoor Water Use Reduction
 1. Commercial clothes washers: Product data indicating compliance with CEE Tier 3A and water usage in gallons per pound.
 2. Residential clothes washers: Product data indicating compliance with ENERGY STAR
 3. Residential dishwashers (standard and compact): Product data indicating compliance with ENERGY STAR
 4. Commercial dishwashers: Product data indicating compliance with ENERGY STAR and water usage in gallons per rack.
 5. Ice machine: Product data indicating compliance with ENERGY STAR and documentation demonstrating air-cooled or closed-loop cooling system.
 6. Food Steamer: Water usage in gallons per hour per pan
 7. Combination Oven: Water usage in gallons per hour per pan
 8. Food waste disposer: Water usage in gallons per minute
 9. Food waste disposer – scrap collector: Water usage in gallons per minute make-up water
 10. Food waste disposer – pulper: Water usage in gallons per minute make-up water
 11. Food waste disposer – strainer basket: Proof of no additional water usage
 12. Water closet and Urinal: Product data indicating WaterSense Label and flush rate in gallons per flush (gpf)
 13. Faucets, aerators and showerheads: Product data indicating WaterSense Label and flow rate in gallons per minute (gpm)
 14. Spray rinse valves: Product data indicating flow rate in gallons per minute (gpm)
- F. EA Prerequisite 4: Fundamental Refrigerant Management and Credit 6: Enhanced Refrigerant Management
 1. Commercial refrigerators, freezers, ice makers, and water coolers: Product data for refrigerant listed in pounds.
- G. EA Credit 3: Advanced Energy Metering
 1. Product data indicating data storage capabilities.

- H. EA Credit 4: Demand Response
 - 1. Product data for interval recording meters.
- I. Materials and Resources (MR) Credit 5: Construction and Demolition Waste Management
 - 1. Waste Management Progress Reports: Refer to Division 01 Section "Construction and Demolition Waste Management and Disposal."
- J. EQ Prerequisite 3: Minimum Acoustic Performance
 - 1. Acoustic wall and ceiling systems in all Core Learning Spaces: Product data indicating the Noise Reduction Coefficient (NRC).
- K. EQ Credit 1: Enhanced Indoor Air Quality Strategies
 - 1. For wall-mounted carbon dioxide sensors: Documentation indicating accuracy in percent.
- L. EQ Credit 3: Construction IAQ Management
 - 1. Provide manufacturer product data indicating MERV rating of temporary and final filtration media.
 - a. Include dates and locations of all filter replacement installations.
 - 2. Provide 18 photographs, at least three different periods of time during construction to demonstrate the implementation of SMACNA measures, annotated with date measure in place, and general location of the photograph.
 - a. Alternatively, provide a narrative demonstrating how the IAQ Plan was implemented and describing the protection of materials from moisture damage.
- M. IN Credit 1: Reduced Mercury in Lamps
 - 1. Product data for all mercury-containing lamps, indicating mercury content in milligrams, mean lumen output, and lamp life in hours.

1.7 CLOSEOUT SUBMITTALS

- A. LEED Online: At completion of construction and prior to contract closeout, complete the LEED Online Form and upload the associated required documentation to the LEED Online Project Database for the following.
 - 1. MR Prerequisite 2 and Credit 5: Construction and Demolition Waste Management
 - 2. EQ Credit 3: Construction IAQ Management Plan
- B. Respond to questions and requests from USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application.

1.8 CONTRACTOR LEED COORDINATOR

- A. Designate one employee or consultant as the Contractor LEED Coordinator for this Project.
 - 1. Maintain access to LEED Online at project award and throughout project.
 - 2. Document all credits assigned to the Contractor.
 - 3. Attend all LEED meetings.

1.9 CONSTRUCTION MEETINGS

- A. Pre-construction Conference: Contractor will schedule a LEED coordination conference at a time convenient to Owner, Architect, and Contractor.
 - 1. Attendees: Authorized representatives of Owner, Architect, Contractor and its superintendent and LEED Coordinator; and other concerned parties as appropriate.
 - 2. Agenda: Discuss items of significance that could affect meeting LEED requirements, including the following:
 - a. LEED Scorecard and required certification level.
 - b. Role of Contractor LEED coordinator.

- c. General requirements for LEED-related procurement and documentation, including the LEED submittal review process.
 - d. Erosion and sedimentation control.
 - e. Commissioning participation and coordination.
 - f. Construction waste management.
 - g. Indoor air quality management.
 - h. Project closeout requirements and LEED certification procedures.
- B. Include the status of LEED green building-related work on the agenda of all required regularly scheduled job-site meetings.

PART 2 - PRODUCTS

2.1 EXTERIOR LIGHTING

A. Backlight and Glare Rating: Maximum based on the following:

Luminaire Mounting	MLO Lighting Zone				
	LZ0	LZ1	LZ2	LZ3	LZ4
	Allowed Backlight Ratings				
> 2 mounting height (mh) from lighting boundary (lb)	B1	B3	B4	B5	B5
1 to 2 mh from lb and properly oriented (ph)	B1	B2	B3	B4	B4
0.5 to 1 mh to lb and ph	B0	B1	B2	B3	B3
< 0.5 mh to lb and ph	B0	B0	B0	B1	B2
Allowed Glare Ratings					
Building-mounted (Bm) > 2 mh from any lb	G0	G1	G2	G3	G4
Bm 1-2 mh from any lb	G0	G0	G1	G1	G2
Bm 0.5 to 1 mh from any lb	G0	G0	G0	G1	G1
Bm < 0.5 mh from any lb	G0	G0	G0	G0	G1
All other luminaires	G0	G1	G2	G3	G4

B. Uplight Rating: Maximum based on the following:

MLO Lighting Zone				
LZ0	LZ1	LZ2	LZ3	LZ4
Allowed Uplight Ratings				
U0	U1	U2	U3	U4

2.2 HEAT ISLAND EFFECT – ROOF SURFACE MATERIALS

- A. Solar Reflectance Index (SRI) for roof surface materials:
1. Low-sloped Roofs: Minimum 0.82 initial SRI; or minimum 0.64 for three-year aged SRI.
 2. Steep-sloped Roofs. Minimum 0.39 initial SRI; or minimum 0.32 for three-year aged SRI.

2.3 HEAT ISLAND EFFECT – NONROOF SURFACE MATERIALS

- A. Solar Reflectance (SR) for shading device surface material: Minimum 0.33 initial SR; or minimum 0.28 for three-year aged SR.
- B. Solar Reflectance (SR) for exterior paving surface materials: Minimum 0.33 initial SR; or minimum 0.28 for three-year aged SR.

2.4 AIR FILTRATION MEDIA

- A. Temporary filtration media: Filtration media rated for minimum efficiency reporting value (MERV) of 8 minimum, when tested in accordance with ASHRAE 52.2-2007.
 - 1. Alternative Compliance Path: Provide Class F5 or higher filtration media, in accordance with CEN Standard EN 779-2002.
- B. Permanent filtration media for each ventilation system that supplies outdoor air to occupied spaces: Filtration media rated for minimum efficiency reporting value (MERV) of 13 minimum when tested in accordance with ASHRAE 52.2-2007.
 - 1. Alternative Compliance Path: Provide Class F7 or higher filtration media, in accordance with CEN Standard EN 779-2002.

2.5 CLEANING PRODUCTS AND EQUIPMENT

- A. Give preference to Green Seal qualified spot removers and cleaning agents for each given application.
- B. Use HEPA-filter equipped vacuum cleaners for the final cleaning.

PART 3 - EXECUTION

3.1 GENERAL

- A. Incorporate procedures and processes during Construction and prior to occupancy as described herein.
- B. Provide and enforce Construction Indoor Air Quality Plan for all construction activities within the building.

3.2 HVAC PROTECTION

- A. If permanent HVAC is used during construction: Use filtration media at each return air grill. All HVAC systems, equipment and pathways to be dust and particulate free at time of substantial completion of that phase of construction, in accordance with SMACNA "IAQ Guidelines for Occupied Buildings Under Construction."
 - 1. Begin construction ventilation after building is substantially enclosed.
 - 2. Prevent movement of air from construction area to occupied area when working in a portion of an occupied building.
- B. Keep HVAC system clean, free of dust, debris, moisture, gaseous and microbial contamination during storage, handling, installation and punch-out. Inspect all air inlets, air outlets, grilles, diffusers, plenums, and ducts upon completion of work.
 - 1. Cover and protect (taped plastic or similar method) all exposed air inlet and outlet openings, grilles, ducts, plenums, to prevent water, moisture, dust and other contaminate intrusion.
 - 2. Apply protection immediately after installation of equipment and ducting.
 - 3. Protect at end of each Work day duct runs that require more than a single day to install.
 - 4. Check and repair leaks in return ducts and air handlers.
 - 5. Do not use mechanical rooms for construction storage.
 - 6. Inspect filtration monthly and replace as needed with new MERV 8 filtration media throughout the HVAC system.
 - 7. Install new filtration media throughout the HVAC system after final phase of construction.
 - 8. Cleaning of ductwork is not part of this contract; if Contractor fails to protect ducts and equipment from construction pollutants as specified, provide ductwork cleaning at Contractor's cost.
- C. Install all ceiling tiles prior to HVAC use if an unducted plenum must be used over a construction zone.

3.3 SOURCE CONTROL

- A. Prohibit smoking (including use of electronic cigarettes) within the building and within 25 feet (2.5 meters) of building entrances, operable windows, or outdoor-air intakes.
- B. Limit use of fossil-fueled temporary heating units to propane-powered only inside the building and near building entrances, windows and intakes and within 25 feet of building entrances, operable windows, or outdoor-air intakes.
- C. Provide direct exhaust to the exterior during use of fossil-fueled temporary heating units and installation of strong emitting materials, including touch-up activities.
 - 1. Keep exhaust away from intakes and occupied spaces.
- D. Protect “absorptive” or dry sink materials from exposure to dust, debris and moisture contamination during product delivery, storage and handling from construction, demolition and punch-out activities.
- E. Provide adequate ventilation of packaged dry products prior to installation.
- F. Prohibit “bake-out” or “super-heating” of spaces to accelerate the release of gaseous emissions.

3.4 PATHWAY INTERRUPTION

- A. Relocate pollutant sources when project equipment or staging areas coincide with critical air flow pathways.
- B. Place plastic barriers to contain construction areas.
- C. Temporarily seal building, including air intakes and exhaust vents, and any other building openings, when dust-generating or strong-emitting construction products or procedures are used on the exterior of the building.
- D. Once spaces within building become occupied, work areas must remain under negative pressure. Exhaust air at a rate at least 10 percent greater than the rate of supply.
 - 1. Do not exhaust air where it can be drawn back into occupied spaces.
 - 2. Place continuous plastic barriers creating a seal between construction areas and occupied spaces.

3.5 HOUSEKEEPING

- A. Clean floors regularly to keep dust from accumulating during construction and demolition.
- B. Remove debris from building on a daily basis and suppress dust during construction and demolition activities with wetting agents or sweeping compounds.
- C. Prior to use of return air ductwork without intake filters, clean up and remove dust and debris generated by construction activities.
- D. Use HEPA-filter vacuum throughout for final detailed cleaning.
- E. Remove spills or excess application of solvent-containing products when discovered.
- F. Keep work areas as dry as possible. Replace any absorptive (dry sink) material that is exposed to moisture.

3.6 SCHEDULING

- A. Schedule for storage, installation, and protection of all components of air distribution systems.
- B. Schedule for storage, installation, and protection of absorptive materials (woven, fibrous or porous, such as carpet, ceiling tiles, insulation, and fabrics) from exposure to emissions during and after installation from materials and finishes with potential for short-term release of off-gassing volatile organic compounds.
 - 1. Highlight critical methods used to protect absorptive materials from airborne pollutants such as dust, debris, moisture, gaseous and microbial contamination.

2. Sequence installation of absorptive materials after odor-emitting activities have occurred and have been mitigated by ventilation.

C. Do not store absorptive materials on-site if protection measures as described above cannot be ensured.

3.7 ATTACHMENTS

A. LEED SCORECARD

END OF SECTION

LEED v4.0 BD+C: Schools

Project Scorecard

Glenridge Middle School

Grimm + Parker Associates
8/13/2019



Project Information Form

Y	?Y	?N	N		
Y				PIF1	Project Information

1 Integrative Process Possible Points 1

Y	?Y	?N	N		
				IPC1	Integrative Process

6 Location and Transportation Possible Points 15

Y	?Y	?N	N		
1				LTc1	LEED for Neighborhood Development Location
				LTc2	Sensitive Land Protection
		2		LTc3	High Priority Site
2		3		LTc4	Surrounding Density and Diverse Uses
		4		LTc5	Access to Quality Transit
		1		LTc6	Bicycle Facilities [RP]
2				LTc7	Reduced Parking Footprint [RP]
1				LTc8	Green Vehicles

7 Sustainable Sites Possible Points 12

Y	?Y	?N	N		
Y				SSp1	Construction Activity Pollution Prevention
Y				SSp2	Environmental Site Assessment
1				SSc1	Site Assessment
		2		SSc2	Site Development: Protect or Restore Habitat
1				SSc3	Open Space
	2			SSc4	Rainwater Management
2				SSc5	Heat Island Reduction
1				SSc6	Light Pollution Reduction
		1		SSc7	Site Master Plan
2				SSc8	Joint Use of Facilities [RP]

8 Water Efficiency Possible Points 12

Y	?Y	?N	N		
Y				WEp1	Outdoor Water Use Reduction
Y				WEp2	Indoor Water Use Reduction
Y				WEp3	Building-Level Water Metering
2				WEc1	Outdoor Water Use Reduction
3			4	WEc2	Indoor Water Use Reduction
2				WEc3	Cooling Tower Water Use
1				WEc4	Water Metering

22 Energy and Atmosphere Possible Points 31

Y	?Y	?N	N		
Y				EAp1	Fundamental Commissioning and Verification
Y				EAp2	Minimum Energy Performance
Y				EAp3	Building-Level Energy Metering
Y				EAp4	Fundamental Refrigerant Management

Energy & Atmosphere, cont.

Y	?Y	?N	N		
3				EAc1	Enhanced Commissioning
17				EAc2	Optimize Energy Performance [RP]
1				EAc3	Advanced Energy Metering
		2		EAc4	Demand Response
			4	EAc5	Renewable Energy Production [RP]
1				EAc6	Enhanced Refrigerant Management
	1	1		EAc7	Green Power and Carbon Offsets

2 Materials and Resources Possible Points 13

Y	?Y	?N	N		
Y				MRp1	Storage & Collection of Recyclables
Y				MRp2	Construction and Demolition Waste Management Planning
		5		MRc1	Building Life-Cycle Impact Reduction
		2		MRc2	BPDO: Environmental Product Declarations
		2		MRc3	BPDO: Sourcing of Raw Materials
		2		MRc4	BPDO: Material Ingredients
2				MRc5	Construction and Demolition Waste Management

5 Indoor Environmental Quality Possible Points 16

Y	?Y	?N	N		
Y				EQp1	Minimum IAQ Performance
Y				EQp2	Environmental Tobacco Smoke Control
Y				EQp3	Minimum Acoustic Performance
2				EQc1	Enhanced Indoor Air Quality Strategies
		3		EQc2	Low-Emitting Materials
1				EQc3	Construction Indoor Air Quality Management Plan
		2		EQc4	Indoor Air Quality Assessment
1				EQc5	Thermal Comfort
1		1		EQc6	Interior Lighting
		3		EQc7	Daylight
		1		EQc8	Quality Views
		1		EQc9	Acoustic Performance

5 Innovation Possible Points 6

Y	?Y	?N	N		
1				INc1.1	Green Building Education
1				INc1.2	Purchasing: Lamps
1				INc1.3	Design for Active Occupants
1				INc1.4	Passive Survivability, Backup Power
		1		INc1.5	LTc7 EP
1				INc2	LEED Accredited Professional

55 3 4 48 Total Possible Points 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110 points

[RP] - Regional Priority credit (adds 1 point)

Credit not essential for Silver rating, moved to "No" column

SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The Owner's Project Requirements (OPR) and Basis of Design (BoD) are included by reference for information only.

1.2 SUMMARY

- A. This section includes general administrative and procedural requirements for commissioning of building systems, assemblies and equipment listed in this Section, listed in related commissioning Sections, and listed in individual material or equipment Sections.
- B. Mechanical: The following HVAC systems, assemblies, equipment and components are to be commissioned on this Project:
 - 1. Piping and Pumps.
 - a. Hydronic Piping.
 - b. Refrigerant Piping.
 - 2. HVAC Air Distribution.
 - a. HVAC Ducts.
 - b. HVAC Fans (incl. Destratification)
 - c. Ventilation Hoods.
 - 3. Central HVAC Equipment
 - a. DOAS-OAU
 - b. WSHP
 - c. Pumps
 - 4. Decentralized HVAC Equipment
 - a. Multi-Zone Ductless Split (VRF)
 - b. Cabinet & Unit Heaters – Electric
 - c. VAV and CAVs
 - d. Variable Frequency Motor Controllers (Div 26)
 - 5. Building Automation System (BAS) controls, alarms, and monitoring functions.
- C. Plumbing: The following plumbing systems, assemblies, equipment and components are to be commissioned on this Project:
 - 1. Domestic hot water system, including the following:
 - a. Gas hot water heaters.
 - b. Hot water recirculation pumps.

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- D. Electrical: The following electrical systems, equipment, and components are to be commissioned on this project:
1. Electrical service and distribution, including emergency power (per LEED V4)
- E. Lighting: The following lighting systems, equipment and components are to be commissioned on this project:
1. Lighting controls.
 2. Daylighting controls.
- F. Building Envelope: The following systems, equipment and components are to be commissioned on this project:
1. Below-grade construction, including foundation walls and slabs-on-grade.
 2. Above-grade construction, including: exterior wall systems and assemblies; steep-slope and low-slope roofing; outdoor plazas, planters and plaza paving systems and assemblies over occupied space, and; glazed window, curtainwall and sloped glazing (skylight) systems.
 3. Interface conditions (flashings, expansion joints, and sealant) between each of the materials, components and systems that comprise the above and below-grade building exterior enclosure.
- G. Related Sections:
1. Division 01 Sections "Closeout Procedures", "Operation and Maintenance Data", and "Demonstration and Training" for additional requirements affecting commissioning activities related to project closeout, warranties, operation and maintenance manuals, and demonstration and training.
 2. Division 01 Section "Exterior Enclosure Commissioning" for technical commissioning requirements for building envelope-related systems, assemblies, equipment and components.
 3. Division 22 Section "Commissioning of Plumbing Systems" for technical commissioning requirements for plumbing systems, assemblies, equipment and components.
 4. Division 23 Section "Commissioning of HVAC" for technical commissioning requirements for HVAC systems, assemblies, equipment and components.
 5. Division 23 for requirements for the Building Automation System (BAS).
 6. Division 26 Section "Commissioning of Electrical Systems" for technical commissioning requirements for electrical systems, assemblies, equipment and components.

1.3 DEFINITIONS

- A. BAS, Building Automation System: The centralized control and monitoring system for the building's mechanical, HVAC, electrical, lighting, plumbing, elevator, and fire protection and life safety systems. For commissioning purposes, it includes any new building automation and control systems, as well as the interconnection of new and existing building automation and control systems. See also Division 23 Section "Instrumentation and Controls for HVAC".
- B. BoD, Basis of Design: A document prepared by the Architect/Engineer team (AE) that outlines the set of assumptions and design parameters for calculations, decisions, system options and

product selections to meet the Owner's Project Requirements (OPR) and applicable regulatory requirements.

- C. Certificate of Readiness: Written certification prepared by the Contractor, using form at the end of this Section, certifying the indicated system, assembly, equipment or component has been installed in accordance with the CDs and manufacturer requirements; startup has been completed according to manufacturer requirements and the CDs; and the system, assembly, equipment or component is ready for functional performance testing.
1. The goal of the certificate is to avoid costly delays or invalid functional performance test results due to lack of readiness, absence of commissioning team members, incomplete installation, incomplete sensor calibration, component malfunction, parts unavailability or other similar preventable circumstances.
 2. The certification is a prerequisite of functional performance testing for each system, assembly, piece of equipment, or component indicated to be commissioned.
- D. Commissioning: A systematic quality assurance process helping to verify that all building systems are installed and perform interactively according to the design intent and owner's operational needs. The commissioning process encompasses and coordinates the traditionally separate processes of system documentation, equipment start-up, control system calibration, testing and balancing, performance testing and operator training.
1. Commissioning is a third-party quality assurance process. It does not take the place of or duplicate the Contractor's quality control services required per Division 01 Section "Quality Requirement" or testing, adjusting, and balancing and other quality control testing or inspections required in individual Sections and normally the responsibility of the Contractor.
- E. CxP, Commissioning Provider: An independent entity engaged by Architect but not performing the work of design or construction, or otherwise associated with design team members or the Contractor's team. The CxP facilitates and coordinates the commissioning activities in concert with the Contractor, Architect, and Owner. The CxP is responsible for organizing and coordinating the actions of the commissioning team in implementing the commissioning process.
- F. Commissioning Plan: A document, prepared by the CxP, outlining how commissioning activities will be integrated into general construction and trade activities. The commissioning plan identifies how commissioning responsibilities are distributed. The intent of this plan is to evoke questions, expose issues, and resolve them with input from the entire commissioning team early in construction.
- G. Commissioning Team: The members of the commissioning team consist of the following:
1. CxP: Commissioning Provider.
 2. Architect.
 3. Engineer: Design Engineer, particularly the mechanical engineer.
 4. Contractor.
 5. Subcontractors engaged by the Contractor, as appropriate to product or system being commissioned, including the following:
 - a. Mechanical subcontractor.
 - b. Plumbing subcontractor.
 - c. Electrical subcontractor.

- d. Testing, Adjusting, and Balancing subcontractor.
 - e. Controls subcontractor(s).
 - f. PV subcontractor.
- H. Construction Checklist: A form used by the commissioning team during procurement and installation of systems, assemblies, equipment, and components with a list of items that once completed and “checked off” serves as written verification that each system, assembly, piece of equipment, or component to be commissioned has satisfactorily been delivered to the site, is ready for installation, and has been correctly installed. The forms may be hosted on the internet and manipulated via web-based interface.
- I. Deferred Testing: Functional performance testing performed after Substantial Completion, and after occupancy but before the warranty period is completed. Includes seasonal testing and may include delayed testing.
- J. Deficiencies, Recommendations, and Resolution Log: A list of deficiencies, issues, and recommendations for improvements that require action, decision, correction or closure. Items will be categorized as “open” or “closed” on a continuing basis throughout the project. The list is maintained and monitored for completion by the CxP, but resolution and action is the responsibility of the entire commissioning team.
- K. Deficiency: A condition in the installation or function of a component, piece of equipment, system, or assembly that is not in compliance with the Contract Documents, OPR, BoD, or does not meet the acceptance criteria of functional performance testing.
- 1. Deficiencies resulting from work that is not in compliance with the Contract Documents are the responsibility of the Contractor to correct at no additional cost to the Owner, including costs for retesting, as applicable.
- L. FPT, Functional Performance Testing: The testing process conducted to confirm that specific components, assemblies, systems, and interfaces among systems function and perform in accordance with the OPR and the Contract Documents. FPT includes the dynamic examination of specific individual components and equipment as well as interacting equipment, systems, and assemblies as a whole, in full operation. FPT methods may include direct observation or trending by the BAS.
- 1. FPT is part of the commissioning process and is not meant to duplicate quality control services required per Division 01 Section "Quality Requirements" or testing, adjusting, and balancing and other quality control testing or inspections required in individual Sections and normally the responsibility of the Contractor.
- M. FPT Procedures: The written procedures and documentation forms of tests used to guide and record functional performance testing. FPT procedures are composed of repeatable, step-by-step procedures and include the test prerequisites, the test process, the expected outcomes and acceptance criteria. Forms or space for recording the results of tests may be included integrally in the written procedures or attached on separate sheets.
- 1. Responsibility for developing FPT procedures is shared between the CxP, the AE, the Contractor and the responsible trade subcontractors, generally including the mechanical, electrical, TAB and controls trades. The CxP is responsible for developing the final FPT procedures and acceptance criteria.

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- N. Owner's Project Requirements (OPR): The documentation of the functional requirements of the facility and Owner's expectations of how it will be used and operated. This includes project and design goals, measurable performance criteria, budgets, schedules and supporting information. Sustainable design goals for energy and water efficiencies and indoor environmental qualities are articulated in this document.
- O. Pre-Functional Checklist: A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment prior to pre-functional testing. Pre-functional checklists augment and are combined with the manufacturer's start-up checklist. Pre-functional checklists are typically static inspections and procedures to prepare the equipment or system for initial operation, such as checking belt tension, oil levels, labels are affixed, gages in place, and sensors are calibrated. However, some pre-functional checklist items entail simple testing of the function of a component, a piece of equipment or system. The word "pre-functional" refers to "before functional testing". The forms may be hosted on the internet and manipulated via web-based interface.
- P. Sampling: A process for evaluating a subset (sample) of the total population and statistically applying the results to the entire population. In commissioning, it is a defined strategy for functional performance testing where a predetermined percentage of randomly selected, identical pieces of non-critical equipment undergo FPT and the test results are used as a statistical representation of the performance of the remaining, untested pieces of equipment. Where equipment in the sampling fail to meet the FPT acceptance criteria, an additional sampling undergoes FPT until the sampling meets the acceptance criteria.
1. Sampling is not allowed on this Project except where indicated in the Commissioning Plan and a sampling strategy is clearly outlined in the commissioning specifications.
 2. Sampling is not allowed for critical equipment and systems.
 3. Sampling is not allowed for construction checklists, pre-functional checklists, TAB, and startup procedures.
- Q. Startup: The initial starting, energizing, or activating of dynamic equipment for permanent use, including the verification of components and devices using and completing static pre-functional checklists.
- R. Systems, Assemblies, Equipment, and Components: Where these terms are used together or individually, they shall mean "as-constructed" systems, assemblies, equipment, and components.
- S. TAB, Testing, Adjusting and Balancing: Testing, adjusting, calibration, and balancing.
- T. Trend Logs, Trending: The monitoring, by the BAS or other electronic data gathering equipment, and analyzing of the data gathered over a period of time.
- U. Warranty Period: Warranty period for the Project, including systems, assemblies, equipment, components and labor.
1. The warranty period commences on the date of Substantial Completion and extends for one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.
 2. Commencement of the warranty period and its duration is defined in the provisions of the Contract, including General and Supplementary Conditions.

1.4 REFERENCE STANDARDS

- A. Comply with applicable requirements and recommendations of the following referenced standards:
 - 1. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
 - a. ASHRAE Guideline 0-2005 The Commissioning Process.
 - b. ASHRAE Guideline 1.1-2007 HVAC+R Technical Requirements for the Commissioning Process.
 - c. ASHRAE Standard 202-2013 Commissioning Process for Buildings and Systems.
- B. The referenced standards include additional definitions or clarification of industry standard terms affecting the commissioning work.

1.5 COMMISSIONING MEETINGS

- A. Commissioning Kickoff Conference: Schedule and attend a commissioning kickoff meeting within 90 days of the award of contracts.
 - 1. Attendees: All members of the commissioning team see 1.3.G.
 - 2. Location: Project site.
 - 3. Agenda: The CxP shall lead the commissioning kickoff conference to review the commissioning process in detail, including the following:
 - a. Review each building system to be commissioned, including its intended operation, commissioning requirements, and completion and start-up schedules.
 - b. Establish the scope of work, tasks, schedules, deliverables, and responsibilities for implementation of the Commissioning Plan.
 - c. Review and distribute sample forms and logs to be used during the commissioning process.
 - 4. Minutes: The CxP shall prepare minutes for the meeting.
- B. Controls Coordination Meeting: Schedule and attend a controls coordination meeting after the preparation of the controls submittals specified in Division 23 Section "Instrumentation and Controls for HVAC". The CxP shall lead this meeting and shall prepare and distribute meeting minutes. The agenda for this meeting is to facilitate resolution of review comments and to verify the sequence of operation for each system is complete and coordinated amongst the respective trades.

1.6 INFORMATIONAL SUBMITTALS

- A. Schedule of Commissioning Activities: Process and schedule for completing construction checklists, pre-functional and start-up for systems, assemblies, equipment and components to be commissioned.
- B. System and Equipment Commissioning Submittals: In addition to product data and shop drawings required in individual sections, submit the following project-specific information for each system

and assembly, and for each piece of equipment and component to be commissioned, in accordance with Division 01 "Submittal Procedures" for review by Architect and the CxP. This information will be reviewed by the CxP for compliance with the Contract Documents, OPR, and BoD, and will be used to finalize commissioning requirements and test procedures. CxP comments are returned to the Contractor via the AE team, with a copy directly to the Architect. Include the following:

1. Manufacturer's detailed installation requirements and checklists including access and clearance dimensions.
 2. Manufacturer's detailed start-up requirements and checklists.
 3. Detailed product performance data for each piece of equipment including part load capacities, performance curves, electrical components and requirements, etc.
 4. Logic flow diagrams for temperature control systems and sequences of operation.
 - a. Include applicable portions of the sequence of operation for related function groups.
 - b. Annotate function groups for clarity.
 - c. Indicate initial setpoints and reset schedules.
- C. Construction Checklists: Prior to delivery of equipment or components to the Project site, or installation of systems and assemblies, submit draft copy of proposed construction checklists, including manufacturer checklists and manufacturer's startup checklists.
1. Submit fully executed construction checklists as part of Certificate of Readiness.
- D. Test Equipment, Instrumentation, and Tools: Submit list of test equipment, instrumentation, and tools required to perform functional performance testing. Identify proprietary test equipment, instrumentation, and tools. Include calibration certificates for test equipment and instrumentation.
- E. Startup Documents:
1. Startup Plan: A minimum of seven days before beginning startup activities, submit startup plan describing startup procedures. Include list of personnel that will be performing startup activities. Include draft copy of manufacturer's startup instructions and manufacturer's startup checklists and other related documents.
 2. Startup Report: Include report and fully executed startup checklists and related documents.
 - a. Draft Report: Submit draft start-up reports to the CxP within seven days following successful completion of startup and energization.
 - b. Final Report: Submit final start-up reports to the Architect and to the CxP within fourteen days following successful completion of the start-up and energization.
- F. TAB Reports: Include initial draft and final versions.
- G. Certificate of Readiness: Submit Functional Performance Test Certificate of Readiness attached at the end of this Section for each system, assembly, component and piece of equipment in accordance with the following:
1. Submit fully executed Functional Performance Test Certificate of Readiness before functional performance testing is scheduled to begin, indicating construction checklists, pre-functional checklists, and start-up procedures have been completed.

2. Include copies of completed, fully executed construction and startup checklists.
- H. Test Reports: Submit test reports, test forms, certifications, and other documentation resulting from FPT. Include data trend logs in compiled electronic XLS format.

1.7 CLOSEOUT SUBMITTALS

- A. Operations and Maintenance Manual: Submit Operations and Maintenance (O&M) Manual(s) in electronic format to the CxP, prepared in accordance with Division 01 Section "Operation and Maintenance Data" and the following:
1. Complete commissioning submittals as specified in this Section.
 2. Manufacturer's break-in instructions.
 3. Manufacturer's suggested service requirements.
 4. Spare parts list edited for specific equipment used on the project.
 5. Copy of all equipment specifications.
 6. Preventative maintenance instructions.
- B. Training verification forms, including attendee lists.
- C. Commissioning issues reports, showing resolution of issues.
1. Include correspondence or other documents related to resolution of issues.
 2. List unresolved issues and reasons they remain unresolved and should be exempted from the requirements for Construction Phase Commissioning Completion.
- D. Provide data trend logs in compiled electronic XLS format as defined in 23 0800.

1.8 COORDINATION

- A. Schedule: Coordinate Contractor's Construction Progress Schedule developed in accordance with Division 01 requirements with commissioning activities. Determine, with CxP assistance, appropriate durations for each commissioning activity specified, and identify the following commissioning activities, including related milestones, in the Construction Progress Schedule:
1. Equipment submittal submission and review.
 2. O&M Manual submission and review.
 3. Training Plan submission and review.
 4. TAB Plan submission and review.
 5. TAB Work.
 6. TAB Report submission and review.
 7. Start-up and energization for each system or piece of equipment.
 8. Pre-Functional Tests for each system.
 9. Training sessions for each system.
 10. System Readiness Checklist submission and review for each system.
 11. Functional Performance Testing for each system.
 12. Functional Performance Re-testing.
 13. Flush-Out, if applicable, to occur after commissioning and before occupancy.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

- A. General: Provide test equipment, instrumentation, and tools necessary to perform function performance testing. Use test equipment and instrumentation that has been calibrated, certified, and properly maintained.
 - 1. Test equipment and instrumentation required to perform the commissioning shall remain the property of Contractor unless otherwise indicated.
 - 2. Proprietary test equipment, instrumentation, and tools shall become the property of Architect at Substantial Completion.
 - a. Proprietary test equipment, instrumentation, and tools are those manufactured or prescribed by tested equipment manufacturer and required for work on its equipment as a condition of equipment warranty, or as otherwise required to service, repair, adjust, calibrate or perform work on its equipment.

PART 3 - EXECUTION

3.1 COMMISSIONING, GENERAL

- A. General: Do not operate or temporarily use systems, assemblies, equipment or components indicated to be commissioned, unless otherwise approved in writing by Architect.
 - 1. Where the Architect approves temporary construction use of any system, assembly, equipment or component, provide extended warranty on the Contractor may need to provide the Architect with extended warranty protection on parts, labor and refrigerant through the manufacturer or manufacturer authorized representative pursuant to the General Conditions.

3.2 COMMISSIONING PROVIDER (CxP) RESPONSIBILITIES

- A. Commissioning Plan: The CxP shall develop and maintain the Commissioning Plan.
- B. Schedule: The CxP shall provide input to Contractor for scheduling commissioning activities, and review commissioning schedule developed by Contractor.
- C. Submittals: The CxP shall review and comment on submittals from the Contractor for compliance with the OPR and the commissioning plan. The CxP shall review and comment on issues, note deficiencies, and make recommendations for improvement for issues relative to commissioning and for performance expectations of systems and equipment and interfaces between systems to be commissioned.
- D. Checklists: The CxP shall review draft construction checklists prepared by Contractor and shall develop and provide final project-specific construction and pre-functional checklists. The CxP shall verify checks are being performed by the Contractor in accordance with the final checklists.

- E. Startup and TAB Verification: The CxP shall verify startup, and testing, adjusting and balancing of the Work has been completed in accordance with the OPR and in preparation for functional performance testing. The CxP shall witness startup and TAB of critical systems.
- F. FPT Procedures: With assistance from the Contractor, the CxP shall develop and provide functional test procedures for assemblies, equipment and components furnished and installed for systems to be commissioned, including to verify operation and integration of any new components placed into service in existing systems.
- G. FPT Testing: The CxP shall witness functional performance testing and record test results, including deferred testing as applicable. The CxP shall verify test data, inspection reports and certificates for FPT are included in commissioning documentation.
- H. Deficiencies, Recommendations, and Resolution Log: The CxP shall maintain a written log of deficiencies, issues, recommendations, and resolutions; and shall track resolution of each item until it is resolved or accepted by the AOC Construction Manager.
- I. Closeout Documents: The CxP shall review and verify the operation and maintenance manual submittals are complete and shall verify the demonstration and training program was completed and effective.
- J. Final Commissioning Report: The CxP shall author a commissioning summary report and verify functional performance test data and certificates are included in the commissioning record.
- K. Near-End-of-Warranty Walkthrough: The CxP shall conduct a review and walkthrough of the commissioned systems with the Architect's Construction Manager and Operation and Maintenance staff.
- L. Systems Manual: The CxP shall compile a systems manual with operation and maintenance documentation, and recommendations and plans for ongoing commissioning, measurement and verification, and optimization of the commissioned systems.

3.3 CONTRACTOR RESPONSIBILITIES

- A. Contractor Responsibilities: Contractor is responsible for the commissioning of all installed equipment and systems as required in the Contract Documents.
 - 1. Include all costs of commissioning requirements including manufacturer-certified start-up and testing of installed equipment in the base contract price.
 - 2. Provide utility services, personnel, materials, tools, testing equipment, instrumentation and all other resources required for the commissioning process.
 - 3. Assign representatives with expertise and authority to act on behalf of the Contractor and schedule those individuals to participate in and perform commissioning team activities including, but not limited to, the following:
 - a. Attend commissioning team meetings, including a construction phase controls integration meeting.
 - b. Provide technicians who are familiar with the construction and operation of installed systems and participate in testing of installed systems, subsystems, and equipment.

- c. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
- d. Perform commissioning tests, including deferred testing.
- e. Participate in assemblies, equipment and component training as specified for systems to be commissioned.
- f. Participate in the Near End-of-Warranty review meeting and walkthrough.
- g. Provide information requested by the CxP for commissioning documentation for inclusion in the final commissioning report and systems manual.

3.4 MOCKUPS

- A. General: Before installing portions of the Work requiring mockups, build mockups in accordance with Division 01 "Quality Requirements" and the following requirements, using processes, techniques, assemblies, materials, equipment, and components indicated for the completed Work:
 1. Build integrated, static, non-functioning mockups in location and of size indicated, or if not indicated, as directed by Architect, for materials, equipment, and assemblies indicated in individual Sections, and the following:
 - a. Water Source Heat Pumps
 - b. VAV Terminal Units
 - c. VRF Terminal Units
 2. Schedule mockup construction and review period prior to installation of typical equipment to facilitate completion and minimize rework.
 3. Demonstrate installation techniques and workmanship which result in ease of access, operability, and maintenance.
 4. Integrate the work of each trade required for a complete system. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
 5. Notify Architect, AE and CxP five days in advance of dates and times when mockups will be constructed. Obtain Architect's approval and CxP review of mockup before proceeding with subsequent installations.
 - a. Make necessary corrections to installation and to subsequent construction to comply with Contract Documents and to maximize ease of access, operability, and maintenance.
 - b. Allow two days for initial review and each re-review of each mockup and each corrected mockup.
 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

3.5 INSTALLATION VERIFICATION

- A. Construction Checklists: Using construction checklists, perform installation verification on each system and assembly indicated to be commissioned, including each individual piece of equipment and component. Verify that materials and components are complete and undamaged upon delivery to the Project site and prior to installation. Prior to installation, verify that materials and adjacent construction are acceptably prepared and ready for installation of system, assembly,

equipment or component. Use manufacturer's checklists to ensure installation has occurred in accordance with manufacturer requirements. Verify that systems, assemblies, equipment, and components have been installed in accordance with the Contract Documents and in a manner that will allow for access and ease of maintenance.

1. Installation verification shall be performed and certified by the individuals responsible for the component installation.
2. Verify installation and complete construction checklists for each individual piece of equipment and component, as well as each individual system and assembly. Sampling is not allowed.

- B. Certification: Prior to beginning functional performance testing, certify that installation verification has been completed.

3.6 STARTUP PROCEDURES

- A. Startup Plan: For each system, assembly, and piece of equipment, develop and submit a written startup plan describing steps and procedures that will result in its successful startup and energization in accordance with manufacturer requirements and the Contract Documents. Indicate names and qualifications of personnel that will be conducting startup activities. Include manufacturer startup instructions and manufacturer's startup checklists, as applicable.

- B. Startup, General: Comply with startup requirements required in this Section as well as individual material and equipment sections.

1. Use manufacturer's startup checklists to ensure pre-startup and startup procedures are performed in accordance with manufacturer requirements.
2. Unless otherwise indicated, conduct startup using manufacturer technical representatives or manufacturer-certified technicians, experienced in startup of actual equipment or system being started.
3. Comply with procedures indicated in approved start-up plan.
4. Startup procedures are to make system, assembly, or equipment ready for permanent use. Once startup procedures have been completed, do not shut-down equipment. Do not temporarily startup systems, assemblies, or equipment for TAB, commissioning, or other reasons.

- C. Startup Reports: Prepare and complete startup reports, documenting dates, activities and procedures performed, and results of startup.

1. Startup reports shall be completed and certified by the individuals responsible for the startup.

- D. Sensor Calibration:

1. Calibrate sensors as part of startup procedures, prior to testing, adjusting, and balancing.
2. Comply with default sensor tolerance criteria listed below, except where alternative sensor tolerance criteria are approved in writing as part of the submittal process.

<u>ITEM MEASURED BY SENSOR:</u> <u>(+/-):</u>	<u>REQUIRED</u>	<u>TOLERANCE</u>
COOLING COIL, CHILLED AND CONDENSER WATER TEMPERATURE:	0.3	DEG F.
AHU WET BULB AND DEW POINT TEMPERATURE:	1.0	DEG F.
HOT WATER COIL AND BOILER WATER TEMPERATURES:	1.0	DEG F.
OUTSIDE AIR, SPACE AIR, AND COIL AIR TEMPERATURES:	0.5	DEG F.
PRESSURES FOR AIR, WATER, AND GAS: VALUE.	3.0	PERCENT OF DESIGN
FLOW RATES FOR AIR: VALUE.	5.0	PERCENT OF DESIGN
FLOW RATES FOR WATER: VALUE.	4.0	PERCENT OF DESIGN
FLOW RATES FOR NATURAL GAS OR OIL: VALUE.	1.0	PERCENT OF DESIGN
FLOW RATES FOR STEAM: VALUE.	3.0	PERCENT OF DESIGN
WATT-HOUR, VOLTAGE, AND AMPERAGE: VALUE.	1.0	PERCENT OF DESIGN
LIGHTING ILLUMINATION: VALUE.	3.0	PERCENT OF DESIGN
COMBUSTION FLUE TEMPERATURES:	5.0	DEG F.
OXYGEN OR CO2 MONITOR:	0.1	PERCENT POINTS.
BAROMETRIC PRESSURE:	0.1	IN OF HG.

- E. Cleaning: Perform a progress cleaning of equipment and components according to requirements in Division 01 Section "Execution".
1. Replace filter media immediately prior to occupancy.
 2. Clean strainers immediately prior to occupancy.
- F. Certification: Prior to beginning functional performance testing, certify that startup and sensor calibration has been completed.

3.7 TESTING, ADJUSTING, AND BALANCING

- A. General: Perform testing, adjusting, calibration, and balancing indicated in individual system, material, and equipment Sections and Division 23 Sections "Testing, Adjusting, and Balancing" and "Instrumentation and Controls for HVAC".
1. Submit pipe and duct leak and pressure test reports to CxP.
- B. Certification: Prior to beginning functional performance testing, certify that testing, adjusting, calibration, and balancing has been completed.

3.8 CERTIFICATE OF READINESS

- A. General: Where certification is required prior to beginning functional performance testing, submit Certificate of Readiness a minimum of seven days before functional performance testing is scheduled to commence. The Certificate of Readiness is a prerequisite for functional performance testing for each of the [following] systems, assemblies, equipment, or components to be commissioned.
1. DOAS
 2. WSHPs
 3. Pumps
 4. VRF System
 5. Heating Water System
 6. Lighting controls
- B. Readiness: Review functional performance test procedures and coordinate attendance of necessary participants of the commissioning team for each test. Verify the following items have been completed and are in compliance with the Contract Documents:
1. Manufacturer's required pre-start and start-up procedures have been completed.
 2. Related electrical distribution and service connections have been installed and are functional.
 3. Related refrigeration and cooling components and equipment are installed and functional.
 4. Related heating components and equipment is installed and is functional.
 5. Associated control devices and sensors are installed, calibrated, and functional.
 6. Required testing, adjusting, and balancing work has been completed.
 7. Controls point-to-point checks have been completed.
 8. Sequence of operations has been pretested successfully through each mode defined in the Contract Documents.
 9. Construction checklists, manufacturer's startup checklists, and pre-functional checklists have been completed and submitted to CxP.
 10. Preliminary TAB reports have been completed and submitted to CxP.
- C. Penalty for Lack of Readiness: The CxP schedules testing once the completed Certificates have been signed off on and received. If the CxP finds that pre-checks have not been successfully completed and the systems are not ready for testing, back charges will be incurred by the Contractor. The Owner will impose financial penalties on the Contractor for unforeseen visits by the CxP pursuant to the General Conditions.

3.9 FUNCTIONAL PERFORMANCE TESTING, GENERAL

- A. Preparation: Schedule functional performance testing (FPT) to occur after completion of installation verification, startup procedures, and TAB have been completed for the system, assembly, equipment, or component to be tested; and after associated Certificate of Readiness has been submitted to the CxP. Schedule FPT to occur prior to flush-out, as applicable. Finalize schedule for FPT upon submission of Certificate of Readiness.
1. Do not begin functional performance testing on a system or assembly until each subsystem, subassembly, equipment, or component comprising that system or assembly has completed its functional performance testing.

2. Do not begin functional performance testing on the BAS, controls systems, and any system or equipment being controlled by the BAS or referenced control system until calibration has been completed and all points.
 3. Coordinate attendance of required personnel and furnish equipment necessary to conduct functional performance testing as outlined in FPT procedures developed by the CxP.
 - a. Unless otherwise indicated, functional performance tests shall be executed by authorized representatives of the installing trade subcontractor. In addition to those executing the functional performance tests, individuals present may include equipment manufacturer technical representatives or manufacturer certified technician, as well as qualified representatives of the installer, trade subcontractor(s), TAB subcontractor, and controls subcontractor.
 - b. The CxP shall witness and document results of functional performance testing.
- B. Functional Performance Testing Procedures: Review and comment on the final functional performance test procedures and forms developed by the CxP. Provide feedback to the CxP as to the efficiency of the procedures and possible alternate approaches to achieving the same results. Coordinate test procedures with the Cx team for feasibility, safety, equipment and warranty protection.
1. Sampling: Functional performance test procedures developed by CxP include sampling strategies as outlined in the commissioning plan, such that a pre-determined percentage of identical pieces of non-critical equipment are functionally tested and when acceptance criteria are met and therefore successful performance is verified, the remaining pieces will not undergo functional performance testing. Comply with sampling strategies and procedures indicated in individual commissioning sections.
- C. Functional Performance Testing, General: Test all normal and emergency modes and sequences of operations, including alarms. A combination of test methods may be required to completely test each mode and the full sequence of operations. The CxP shall determine which method, or combination, is most appropriate, including, but not limited to, the following:
1. Each test procedure shall be performed under conditions that simulate normal operating conditions as closely as possible. To greatest extent possible, design conditions will be used for test parameters.
 2. Functional performance testing and verification may be achieved by direct manipulation of system inputs (i.e. heating or cooling sensors), manipulation of system inputs with the building automation system (i.e. software override of sensor inputs), trend logs of system inputs and outputs using the energy management system, or short-term monitoring of system inputs and outputs using standalone data loggers.
 3. Simulated conditions may be imposed to initially test systems; however, this does not relieve the Contractor of his duty to perform deferred testing. Alter set points and sensor values when simulating conditions is not practical.
- D. Safety Operations: Where equipment requires integral safety devices to stop or prevent equipment operation unless minimum safety standards or conditions are met, functional performance test procedures shall demonstrate the actual performance of safety shutoffs in real or closely-simulated conditions of failure.
- E. Test Order: Unless otherwise indicated by commissioning plan or final functional performance test procedures, conduct functional performance testing in order of complexity, beginning with

least complex systems or components. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.

- F. Test Results: The CxP shall witness and record the results of functional performance testing, and shall confirm in writing whether acceptance criteria have been met, and therefore satisfactory performance has been verified, or whether re-testing is recommended.
1. The CxP will record the results of the tests and trend logs or monitoring on the procedure or test form.
- G. Data Trend Logs: Upon completion of functional performance testing, submit data trend logs for each piece of controlled equipment for each controlled parameter, demonstrating successful performance over the full duration of the controlled process but not less than three days. Include data trend logs demonstrating successful seasonal performance. These trends are in addition to those specified in 230850 ¶3.3.
1. Format: Compile data trend logs in electronic .XLS format using file structure and table columns and row groupings and headings organized in accordance with Architect requirements. Include legend and graphics. Metadata should be provided for all information and request at least a minimum of 15-minute data be made available.
 2. Typical Requested Trending Data: Trend data requests will be customized by project.
 - a. System-level alarms over the trending period
 - 1) All DOAS, RTU, VRF system alarms
 - 2) Any room-specific CO2 or high temperature warnings
 - 3) Filter alarms (if any)
 - b. Operational Data (15-minute)
 - 1) SAT, entering and coil leaving temperatures for all DOAS and RTU
 - 2) Supply and exhaust fan VFD % for all DOAS and RTU
 - 3) Cooling signal and gas heat % - *both operating % as well as the call for.*
 - 4) Dewpoint / humidity operation for all DOAS
 - 5) Space temp and humidity for each DOAS
 - 6) Return humidity and CO2 for single-zone RTUs
 - 7) Heat wheel status and speed for all DOAS and RTU
 - 8) Building pressure static for each RTU
 - 9) Domestic hot water return temp and pump status
 - 10) VRF – space temp and setpoints for the following rooms...

H. Re-Testing:

1. If tests indicate that system, assembly, equipment, or component does not meet acceptance criteria indicated, document the deficiency and report it to the Architect. Upon resolution of deficiencies, re-test using same original parameters unless otherwise directed by Architect and CxP. Notify Architect and CxP a minimum of three days of re-test date of rescheduled tests.
2. Deficiencies which prevent the verification of system performance may be uncovered during tests. Corrections of minor issues identified may be made during the tests at the discretion of the CxP. In cases where the issue cannot be resolved within a reasonable amount of time, document the deficiency and report it to the Architect. Upon resolution of deficiencies, re-test using same original parameters unless otherwise directed by Architect and CxP. Notify Architect and CxP when the issue has been resolved and provide a minimum of three days' notice before re-test date of rescheduled tests.
3. Address all deficiencies in a timely manner. Make every effort to expedite the testing process and minimize unnecessary delays, but do not compromising the integrity of the test procedures. The CxP will not overlook deficient work or loosen acceptance criteria, except at the written direction of Architect.
4. Cost of Re-Testing: The General Conditions outline rules for resolution of claims and disputes.
 - a. Compensation to Owner due to previously identified deficiencies that result in further retest and effort on the part of the CxP or construction delays will be pursued in accordance with the Contract for Construction.

I. Deferred Testing:

1. Delayed Tests: If a test cannot be completed due to an unforeseen occupancy condition, or a deficiency, the functional testing may be delayed upon recommendation of the CxP and the approval of Architect.
2. Seasonal Testing: Systems requiring seasonal testing are identified in other commissioning Sections.
3. Schedule: Schedule and coordinate deferred tests. Schedule deferred tests when specified conditions are available. Notify Architect and CxP at least three days in advance of tests. Where deferred tests are specified, coordinate participation of necessary personnel and of Architect, CxP, and Associate Architect/Engineer (AE). Schedule deferred tests to minimize occupant and facility impact. Obtain Architect's approval of the proposed schedule.

3.10 DEFICIENCIES, RECOMMENDATIONS AND RESOLUTION RECORDS

A. Deficiencies:

1. The CxP shall record deficiencies and non-conformance issues on the Deficiencies, Recommendations, and Resolution Log maintained by the CxP. The CxP shall notify the Architect and the commissioning team within two business days of the discovery of the deficiency or issue. The CxP shall distribute an updated, electronic copy of the log to the Architect, Contractor, AE, and commissioning team at intervals determined in the Commissioning Plan. .
2. The Architect and Contractor, in consultation with the AE when necessary, will determine the responsible party and a suitable plan for resolution. Once a plan for resolution is

determined, the CxP will document it in the Deficiencies, Recommendations, and Resolution Log, and shall close the item upon verification that the proposed resolution has been completed.

3.11 OPERATIONS AND MAINTENANCE DATA

- A. General: Compile an operations and maintenance manual in accordance with requirements in Division 01 "Closeout Procedures" and "Operation and Maintenance Data" sections, this Section, and individual material and equipment sections. Include each commissioned system, assembly, piece of equipment, and component. Incorporate requirements contained in other sections of the specifications that have equipment and system specific requirements. Submit an electronic copy of the O&M manual to the CxP.
- B. Systems Manual: Contractor to cooperate with the CxP by providing the following information and any additional documentation necessary for the compilation of a Systems Manual and Current Facilities Requirements Manual by the CxP for the Project. Provide electronic documentation in format required by CxP.
 - 1. Final Sequences of Operations for commissioned systems, assemblies, and equipment, including detailed point listings with ranges and initial setpoints.
 - a. Control As-Built Drawings must be provided upon request.
 - 2. On-going operating instructions of commissioned equipment. This shall include the following:
 - a. a sequence of operations for the building;
 - b. the building occupancy schedule;
 - c. equipment run-time schedules;
 - d. setpoints for all HVAC equipment;
 - e. set lighting levels throughout the building;
 - f. minimum outside air requirements;
 - g. any changes in schedules or setpoints for different seasons, days of the week, and times of day;
 - 3. Other seasonal operational guidelines by the equipment and system manufacturers.
 - 4. Data sheets for all sensors and actuators by type and use for the commissioned equipment including recommendations for recalibration.
 - 5. Single line diagrams and system schematics of each commissioned equipment and system.
 - 6. Troubleshooting and diagnostic table for the commissioned equipment and system.
 - 7. Preventive maintenance procedures for the commissioned equipment.
- C. Monitoring-Based Cx: For projects pursuing credit for LEED V4 ECx Option, Path 2: Contractors should cooperate with the CxP by providing the following information and any additional documentation necessary for the compilation of a MBCx Plan and Implementation by the CxP for the Project. Scope of the points to be measured should include all energy- and water-consuming systems as delineated by the contract documents and point matrices Provide electronic documentation in format required by CxP.

3.12 DEMONSTRATION AND TRAINING

- A. General: Coordinate, schedule, and conduct demonstration and training for each commissioned system, assembly, piece of equipment, and component in accordance with requirements in

Division 01 "Closeout Procedures" and "Demonstration and Training" sections, this Section, and individual material and equipment sections.

- B. Training Plan: Prior to training, submit a *project-specific* written training plan to Architect and the CxP for review for each training session. The Architect and CxP shall review the training plan for content, adequacy, and rigorosity. Describing in detail the following:
1. Description of system, assembly, equipment and components included in training.
 2. Location and date and time proposed for training, including duration.
 3. Intended audience and learning objectives.
 4. Agenda, including breakdown of subjects covered including description of, duration of, and any special training methods for individual subjects.
 - a. Include name and qualifications for each instructor for each subject.
 5. Methods of training, such as classroom lecture, pre-produced video, site walk-through, actual operational demonstrations, and/or written handouts.
- C. Verification: Contractor to submit completed Training Verification Certificate attached at the end of this Section for each training session.

3.13 NEAR END-OF-WARRANTY REVIEW

- A. General: Participate in the Near End-of-Warranty review and walkthrough conducted by CxP.
1. The review will cover current building operation with input from the operation and facility staff. Outstanding issues related to the construction, particularly those related to the Owner's Project Requirements, and warranty related deficiencies will be addressed. Operational problems and concerns from the facility staff and occupants will be reviewed for compliance with design intent.
 2. The CxP will provide a plan for corrective measures to the Architect and the Contractor for action.

3.14 Corrective Action: Where deficiencies and problems result from work not in compliance with the Contract Documents or where corrective actions are covered under warranty, provide the corrective action at no additional cost to Architect.

3.15 APPENDIX

- A. Sample Certificate of Readiness form
- B. Sample Training Verification Certificate

END OF SECTION 01 91 13

Project Name: PGCPS Glenridge MS	System to be Tested:
Project Address: Landover Hills, MD	Equipment to be tested:

Certificate of Readiness

Requirement: Provide Certificates of Readiness on each commissioned piece of equipment or system prior to testing. A signed certificate is a prerequisite of functional testing for each system to be commissioned.

Intent: Installing contractors affirm this form and provide supporting documentation as needed to acknowledge systems, subsystems and components to be commissioned comply with the contract documents (CDs) and owner’s project requirements. The goal of the certificate is to avoid costly delays due to lack of readiness, absence of team members (trade or subcontractor) integral to each scheduled test, incomplete installation of equipment or systems, and invalid test results due to lack of sensor calibration, component malfunction, parts unavailability.

Completion Requirement

Date By Pre-Functional Checks

- _____ _____ Manufacturer’s required **pre-start and start-up** procedures completed.
- _____ _____ Related **electrical distribution and service connections** installed and functional per CDs.
- _____ _____ Related **refrigeration and cooling components/equipment** installed and functional per CDs.
- _____ _____ Related **heating components/equipment** installed and functional per CDs.
- _____ _____ Associated **control devices and sensors** installed, calibrated, and functional per CDs.
- _____ _____ Required **testing, adjusting and balancing (TAB)** work complete.
- _____ _____ **Control point-to-point** checkout completed.
- _____ _____ **Sequence of operations** successfully pre-tested through each mode as defined in CDs.

Date By Documentation

- _____ _____ **Pre-start/start-up checkout forms** completed and attached/submitted.
- _____ _____ **Control point-to-point checklists** completed and attached/submitted.
- _____ _____ Preliminary **TAB reports** completed and attached/submitted.

Notes _____

I, the undersigned, hereby certify that the above indicated system, assembly, equipment or component has been installed in accordance with the CDs and manufacturer requirements as verified by the construction checklists and this form; startup has been completed according to manufacturer requirements and the CDs; and it is ready for functional performance testing.

BACK CHARGES WILL BE INCURRED IF ERRONEOUS INFORMATION RESULTS IN EXTRA SITE VISITS BY THE CXP.

Contractor Name

Signature

Date

General

Project Name: PGCPS Glenridge MS

Project Address: Landover Hills, MD

Equipment to be Trained: _____

Hours Required: _____

Date of Training: _____

Location of Training: _____

Attendance

Instructor (Names, Company): _____

Attendees (Names, Company): _____

General Object and Scope of Training (Check only one)

- Provide only a general overview of the purpose and operation of this equipment, including required interactions of trainees with the equipment.
- Provide an overview plus technical information of the purpose, operation and maintenance at an intermediate level, expecting that serious malfunctions will be addressed by factory reps.
- Provide an overview plus technical information regarding the purpose, operation, troubleshooting and maintenance of this equipment at a very detailed level, expecting that almost all operation, service and repair will be provided by the trainees.

Training Methods (Check all that apply)

- Training agenda is attached (**this item is required**)
- Use of the O&M manuals, illustrating where the verbal training information is found in writing
- Site demonstration of equipment operation
- Manufacturer training manuals
- Classroom lecture
- Other (Please explain): _____

Approval (Select one)

- The training and demonstration has been completed to the satisfaction of the Operator of the equipment/system.
- No training was required.

Building Operator (or Approving Representative)

Date

SECTION 01 91 15 – BUILDING ENCLOSURE COMMISSIONING**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes requirements for non-structural commissioning of the building exterior enclosure, including, but not limited to the following:
1. Below-grade construction, including foundation walls and slabs-on-grade
 2. Above-grade construction, including: exterior wall systems and assemblies; steep-slope and low-slope roofing; outdoor plazas, planters and plaza paving systems and assemblies over occupied space, and; glazed window, curtainwall and sloped glazing (skylight) systems
 3. Interface conditions (flashings, expansion joints, and sealant) between each of the materials, components and systems that comprise the above and below-grade building exterior enclosure
- B. The materials, components, systems, and assemblies that comprise the above and below-grade building exterior enclosure will be evaluated and tested as outlined in this Section, as well as in accordance with each of the technical Sections associated with the design and construction of the building exterior enclosure. The purpose of the Building Enclosure Commissioning (BECx) will be to provide a process for independent, third-party verification that the installed performance of the building exterior enclosure meets or exceeds the minimum performance requirements set forth by the contract documents (CDs) for this project.
- C. The building envelope commissioning will be managed by the commissioning provider (CxP) retained by the Owner, and will include, by reference, all requirements set forth by the Architect for pre-construction laboratory and field performance testing of the materials, components, systems and assemblies that comprise the building exterior enclosure. In that context, it should be understood by all parties to this project that:
1. Full and complete compliance with the building exterior enclosure performance requirements set forth by the Architect in the CDs and Basis-of-Design (BOD) for this project will be required to achieve successful “commissioning” of the building exterior enclosure.
 2. The requirements of this Section shall in no way relieve the Contractor and other parties to this project of their respective contractual obligations to the Owner for meeting the specified performance levels in the design and construction of this project.
- D. The CxP will provide written summaries (Reports) of the work in progress during the construction of the building exterior enclosure. These reports will include, but may not be limited to, photographs, sketches and diagrams as required illustrating conditions observed in the field, especially deficiencies noted, together with proposed solutions for those conditions where appropriate for further review and acceptance by the Architect-of-Record for the project. Any changes to the contract documents arising out of the Building Exterior Enclosure Commissioning Program must be submitted, reviewed, and accepted in writing, by the Architect-of-Record and Owner and submitted with a series of details/schematics and material specifications to the Contractor for pricing prior to implementation on the project. The Contractor shall be responsible

for coordinating and managing the commissioning responsibilities of each of the subcontractors responsible for the building exterior enclosure.

1.2 RELATED SECTIONS

- A. Division 1 Section 01 9113 "General Commissioning Requirements" for general requirements for commissioning processes.

1.3 INFORMATIONAL SUBMITTALS

- A. Contractor Submittals and Shop Drawings: Concurrent with AE review, the CxP will review submittals for compliance with the Contract Documents. Comments will be returned directly to the AE with a copy to the Owner for coordination of a final submittal review response from the AE to the Contractor. The Contractor is to provide the following submittals to the Commissioning Provider, in addition to submitting them to the Architect-of-Record.
 - 1. Coordination Drawings: Provide cross references on any and all shop drawings indicating that drawings have been checked and cross-referenced by the Contractor to ensure that adjacent elements (i.e. wall elements and fenestration elements) and the dimensions and construction tolerances indicated will allow all work at interfaces to be constructible
 - 2. Qualifications Data: For fabricators, installers, and testing agencies, submit to the Commissioning Provider for review all qualifications required in Divisions 2 through 9 for review.
 - 3. Preconstruction Test Reports: All preconstruction air and water leakage performance test results, including all failed tests, recording the noted deficiency and the required repair, and provide a copy of all remediation processes and QC/QA processes that will be put in place to address the deficiency on future work product
 - 4. Source Quality Control Reports: Retain a copy for field review by the Commissioning Provider and include in the closeout submittal a copy of all manufacturer QA/QC reports submitted for products supplied for the project
 - 5. Field Quality Control Reports: Provide a copy of the test reports for all field water and air penetration and other appropriate building exterior enclosure tests completed
 - 6. Special Inspections Reports: For all special inspections indicated by the Architect/Engineer-of-Record in the specifications.

1.4 CLOSEOUT SUBMITTALS

- A. Provide copies of all test and inspection reports for inclusion in the Systems Manual to be submitted as part of the project closeout documentation.
- B. Provide a Systems Manual as part of the project record closeout documentation that includes, but is not limited to, closeout requirements listed in these specifications and more specifically:
 - 1. As-built drawings, including a copy of all details and drawings that were installed as part of any addendums or change order directives. All deviations shall be clearly marked in red pen.
 - 2. Specifications for the project, including all accepted product substitutions and any additional specifications as part of any addendums or change order directives. All accepted product substitutions and all deviations shall be clearly marked in red pen.
 - 3. A copy of all accepted change orders

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4. A copy of all final shop drawings for each product requiring shop drawings, with the A/E mark-ups and comments, showing final as-built conditions
 5. A copy of all warranties, organized by product, and any and all product manufacturer letters indicating the product as appropriate to use for the application intended on the project as well as any installation guidance
 6. Copies of all the envelope testing and field quality control tests performed.
 7. A master product list summarizing all products used on the project for construction of the building exterior enclosure, organized by tabs in a binder, including the following information:
 - a. Product name
 - b. Product manufacturer
 - c. Catalog or other applicable number for ordering
 - d. Manufacturer's contact information, including the contact information for the technical representatives, including one national contact and one regional technical representative contact
 - e. Product color
 - f. Supplier contact information
 - g. Products installation instructions, including installation instructions supplied with any of the shop drawings that indicated field installed items.
 - h. Manufacturer's product maintenance guide
 - i. Manufacturer's checklist for periodic review of the product indicating how often the product should be checked and the process for implementing a repair
- C. Systems Manual is to be developed for each major building exterior enclosure system; including, but not limited to:
1. Roof/Garden Roof (penetrations, curbs, etc.)
 2. Skylights/Sloped glazing
 3. Exterior walls (metal, insulation, framing, vapor retarder, air barrier, sheathing, etc.)
 4. Windows
 5. Doors
 6. Sealants and expansion joints
 7. Control joints
 8. Flashings (end dams, drip edges, flexible flashing and metal flashings)
 9. Shading devices
 10. Curtain walls or window walls, storefronts
 11. Plaza decks
 12. Planters and planted areas
 13. Below-grade construction, waterproofing, drainage
 14. Floors, slab-on-grade
 15. Other special building exterior enclosure systems, equipment and controls.

PART 2 - (NOT USED)

PART 3 - EXECUTION

3.1 CONTRACTOR RESPONSIBILITIES

- A. Cooperate with the Commissioning Provider, provide access to work, and provide adequate schedule for the work for commissioning tasks.
- B. Furnish copies of all shop drawings, manufacturer's literature, installation instructions, maintenance information, schedules, warranties or other information as requested.
- C. Submit a copy of the General Contractor's project and site specific Quality Assurance program to be implemented for construction for review by the Architect of Record, the Owner and Owner representatives and the Commissioning Provider prior to the kick-off meeting of the Building Exterior Enclosure Commissioning Process.
- D. Participate and ensure all subcontractors utilized for work on this contract participate in meetings prior to beginning construction with the various members of the design and construction teams, including, but not limited to, the Owner, Owner's representatives, Architect of Record, Commissioning Provider, Mechanical Engineer, LEED consultant, suppliers, and manufacturer technical representatives. The subcontractors that must attend this meeting include all subcontractors that will be involved in the construction of the building exterior enclosure, including, but not limited to, the roofing, wall system (including installers for the façade system, including, but not limited to, the metal panel, etc. and installers for the air barrier system and drainage plane and flashing and water management system), flashing, sealant, fenestration, concrete, steel, HVAC, electrical, interior framing and drywall contractors. This meeting will be to discuss construction sequencing and the coordination of trades and the General Contractor's project and site-specific Quality Assurance program to be implemented that will be completed during construction of the building exterior enclosure.
- E. Have a representative present during air and water leakage performance testing of building exterior enclosure materials or systems, as required in this section and individual specification sections in Divisions 2 through 9.
- F. The Contractor is to complete and participate in the construction of on-site mock-ups to check constructability, including elements of the building exterior enclosure, as identified in individual sections of the specifications in Divisions 2 through 9 and provide personnel to be present and have a representative present from each trade and/or subcontractor associated with installing the system during building exterior enclosure air and water leakage performance testing as indicated within the individual sections within Divisions 2 through 9. Personnel from each trade that will be completing the work in the field are to be utilized to construct each required mock-up. Provide a written protocol, timeline for repair of any deficiencies noted during the performance testing and/or a written report from the third party agency performing the tests indicating what repairs were required. If a systemic problem is identified during testing, provide repair and remediation protocol for any systemic failures identified by the Commissioning Provider. Include a timeline for repair of all affected elements. Repaired elements shall not be covered up without review by the Commissioning Provider.

- G. Participate in commissioning meetings with the appropriate subcontractors in attendance, to review and discuss issues and concerns related to the building exterior enclosure noted by the Architect of Record, the Commissioning Provider, and the Owner or Owner's representative, during the previous week and what action will be taken to address the noted non-conformances. Maintain a summary of non-conformances and current status.
- H. Provide a representative to be present, and have a representative present from each trade and/or subcontractor associated with installing the system testing, as indicated within this section and the individual sections within Divisions 2 through 9. Provide a written protocol and a timeline for repair of any deficiencies noted during the performance testing and/or a written report from the third party agency performing the tests indicating what repairs were required. If a systemic problem is identified during testing, please see the following requirement.
- I. Provide a repair and remediation protocol for any systemic failures identified by the Commissioning Provider, including a timeline for repair of all affected elements. Repaired elements shall not be covered up without review and documentation by the Commissioning Provider.
- J. Participate in maintenance orientation and inspection and in one maintenance and training session with the building operations and maintenance staff and other participants identified by the Owner and Architect-of-Record, with the assistance of the Commissioning Provider.
- K. Provide field testing and field quality control tests specified in 3.3.
- L. Provide labor and facilities:
 - 1. To provide access to work to be tested (including lifts if necessary)
 - 2. Provide water service where required for building enclosure commissioning testing
 - 3. Provide 110V electrical power where required for building enclosure commissioning testing

3.2 COMMISSIONING PROVIDER'S DUTIES

- A. Cooperate with the Architect and Contractor and provide qualified personnel when scheduled.
- B. Promptly notify Architect and Contractor of irregularities or deficiencies in work that are observed during performance of services.
- C. Be present to observe all testing of all building exterior enclosure systems as defined in the Contract Documents.
- D. Commissioning Provider is not authorized to:
 - 1. Release, revoke, alter or expand requirements of Contract Documents.
 - 2. Approve or accept any portion of the work.
 - 3. Perform any duties of the Contractor.

3.3 FIELD TESTING

- A. General

1. Contractor shall provide Field Testing specified in this section and in Division 2 through 9 by subcontracting Independent Agencies as indicated herein. Contractor is fully responsible for all testing costs and the costs of subcontracting the independent testing agencies.
2. Field Quality Control: Testing and inspecting of representative areas of the Contract Work shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements. Contractor is fully responsible for all field quality control tests and inspections and the costs of subcontracting the independent testing agencies.
3. Testing is generally performed, except for the mock-up, after completing the installation of the Contract Work and before the installation of interior finishes has begun.
4. Provide a minimum of 2 weeks' notice to all parties to allow them to attend all testing. CxP shall be present for all tests.
5. The Testing Agency shall prepare and submit inspection and test reports.
6. The Testing Agency shall submit non-compliance and deficiency reports as needed.
7. Contract Work will be considered defective if it does not pass tests and inspections.
8. Repair or remove and replace Work that is considered defective, does not meet requirements or that is damaged by testing; replace to conform to specified requirements. Retesting will be performed to determine compliance of replaced or additional work with specified requirements
 - a. The costs for all testing will be responsibility of the Contractor. These costs include, but are not limited to: access, equipment, labor, materials and the Independent Testing and Inspection Agency required to complete retesting.
 - b. All costs associated with the additional tests because of failures that are the result of contractor deficiencies will be charged to the Contractor, including consultant costs of monitoring the retests.

B. Tests:

1. The following testing is required in accordance with Division 02 through 09. Refer to specific specification section for details on quantity of tests and performance requirements. The following is a list of tests from Division 02 through 09, but the contractor shall be responsible for verifying this list is complete, and shall include any tests that have not been referenced below:
 - a. 072710 Fluid-Applied Membrane Air Barriers –
 - 1) Window – Air Leakage Test ASTM E 783
 - 2) Storefront – Air Leakage Test ASTM E 783
 - 3) Curtain Wall/Metal Panels – Air Leakage Test ASTM E 783
 - 4) Curtain Wall and Window perimeter sealant tests – Sealant continuity using smoke test – ASTM E 1186
 - 5) Air Barrier Assemblies – Air Leakage Test ASTM E 1186
 - 6) Canopy and soffits – Air Leakage Test ASTM E 1186
 - 7) Vertical/horizontal expansion joints – Air & Water leakage tests ASTM E 1186
 - b. 084313 Aluminum-Framed Storefronts – Water-Spray Test AAMA 501.2
 - c. 084413 Glazed Aluminum Curtain Walls – Water-Spray Test AAMA 502.1
 - d. 086300 Metal-Framed Skylights –
 - 1) Structural-Sealant Compatibility and Adhesion ASTM C 1401
 - 2) Water-Spray Test AAMA 501.2
2. The mock-up shall also be tested as required in Divisions 02 through 09. Refer to specific specification section for details on quantity of tests and performance requirements.
 - a. 042000 Masonry

- b. 047200 Cast Stone Masonry
 - c. 072500 Weather Barriers
 - d. 074213 Metal Wall Panels
 - e. 074813 Cladding Support Systems.
 - f. 076200 Sheet Metal Flashing and Trim
 - g. 079200 Joint Sealants
 - h. 084413 Glazed aluminum curtain walls
 - i. 088000 Glazing
- C. The following tests shall be performed on the building (and the mock-up) in addition to those specified in Divisions 02 through 09:
- 1. Air Leakage Testing (On-Site Chamber)
 - a. General:
 - 1) This method provides a field test procedure for determining air leakage rates of installed exterior assembly including windows and other penetrations.
 - 2) Testing shall be performed at four (4) locations on the building selected by the CxP and Architect, and shall be performed in one (1) location on the mock-up.
 - 3) Each test area shall be 8'x8' and include at least one window.
 - b. Air Leakage Test:
 - 1) Perform Quantitative Air Testing according to ASTM E 2357 for sustained load, cyclic loads and wind gusts.
 - a) Maximum air leakage may not exceed 0.04 cfm/sqft at 1.57 lb/sqft.
 - 2. Pull-Off Strength Coating Testing
 - a. General:
 - 1) This test method covers a procedure for evaluating the pull-off strength of a coating (applicable to air/vapor barriers and other coatings).
 - 2) Testing shall be performed at eight (8) different locations selected by the CxP and Architect, and shall be performed in one (1) location on the mock-up.
 - b. Pull-Off Testing:
 - 1) Perform according to ASTM D4541 or other applicable test depending on specified coating.
 - 3. Roof Drain Flood Testing
 - a. General:
 - 1) This test is intended to uncover leaks at roof drains in low slope roofs only. Full roof flood testing is not recommended or required.
 - 2) Testing shall be performed on 10% of internal drains in low slope roofs, but not less than four (4) different locations.
 - b. Flood Testing:
 - 1) Perform similarly to ASTM D5957. Test duration is 24 hours within minimum 1" water depth. Flood roof drains only. Test is successful if no leaks are identified to have occurred during the test period.

3.4 TESTING VERIFICATION

At substantial completion of the project,

- A. The General Contractor is to:

1. Certify that building exterior enclosure systems, subsystems, and construction have been completed according to the Contract Documents, including all addenda and change order requirements.
 2. Certify that Field Quality Control procedures have been completed, and that field quality control reports have been submitted, discrepancies corrected, and corrective work approved. Provide a copy of the list of nonconformances maintained by the General Contractor indicating all rework and corrections completed.
- B. The Commissioning Provider is to:
1. Review that Field Quality Control procedures have been completed, and that field quality control reports have been submitted, discrepancies corrected, and corrective work approved.
 2. Annotate checklist or data sheets when a deficiency is observed.
 3. Review that quality-control testing of building exterior enclosure has been completed and approved.

3.5 DEFERRED TESTING

- A. If field tests cannot be completed because of a deficiency outside the scope of the Building Exterior Enclosure, the deficiency shall be documented and reported to the Owner and the Architect-of-Record. Deficiencies shall be resolved and corrected by appropriate parties and the test rescheduled.

3.6 SYSTEMS TO BE COMMISSIONED

- A. Refer to Divisions 2 through 9 of the Specification Sections for specific requirements for commissioning each building exterior enclosure element and system. The systems and elements to be commissioned include, but are not limited to:
1. Roofs, including the garden roof system, including all penetrations, transitions, etc.
 2. Skylights and other sloped glazing
 3. Exterior walls, including the air barrier system, and water management systems
 4. Windows
 5. Doors, louvers
 6. Sealants and expansion joints
 7. Control joints
 8. Flashings, including all transitions, end-dams, etc.
 9. Shading devices
 10. Curtain walls or window walls, storefront
 11. Plaza decks
 12. Planters and planted areas
 13. Below-grade construction, including drainage and waterproofing/damp proofing
 14. Floors, slab-on-grade
 15. Interface conditions between each of the above listed elements
 16. Fire separation/stopping and smoke control
 17. Other special building exterior enclosure systems, equipment and controls.

END OF SECTION 01 91 15

SECTION 02 30 00 - SUBSURFACE DRILLING AND SAMPLING INFORMATION

PART 1 GENERAL

1.1 The following information is included in the Project Manual for bidders' use in preparing bids, but is not part of the Contract Documents, and does not relieve the bidders from doing their own investigation to determine the accuracy of the information.

A. Geotechnical Engineering Report, Glenridge Middle School; dated December 20, 2018.

1.2 STATEMENT CONCERNING THE BORING DATA

A. The test borings and samples of the soils encountered were obtained by the Architect to assist the Architect and his consultants in determining the type and design of the foundation systems.

B. The test borings were made by Geotech Engineers, Inc., in accordance with their system of soils classification and they, Geotech Engineers, Inc., neither the Owner, the Architect, or his consultants guarantee the accuracy or consistency of the information contained within the Geotechnical Report with the actual site conditions.

C. Any radical deviation from the anticipated material, as indicated by the borings, during the excavation for the building should be reported to the Architect immediately and confirmed in writing.

1.3 CONFIRMATION OF BORING DATA

A. Bidders, Contractors, and any others who are concerned with, or are affected by the test borings should make their own borings and tests at the site.

B. No additional compensations will be allowed the Contractor for failure to fully investigate the site or for the neglect of the information contained in the Boring Logs.

1.4 ATTACHMENT

A. Geotechnical Engineering Report, Glenridge Middle School; dated December 20, 2018.

PART 2 PRODUCTS (NOT USED)

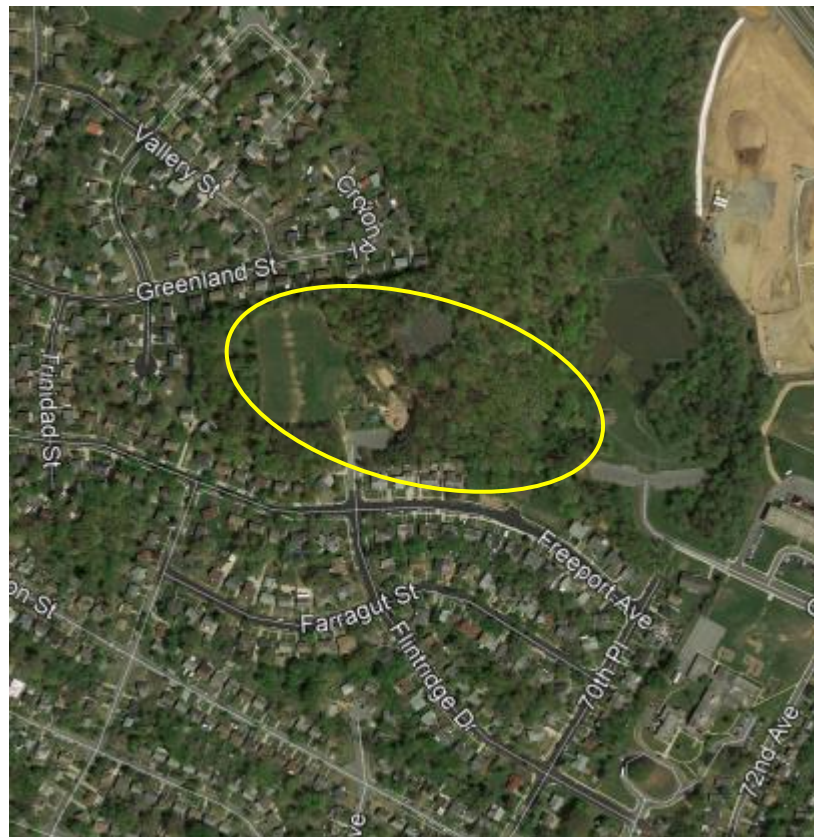
PART 3 EXECUTION (NOT USED)

END OF SECTION



GEOTECHNICAL ENGINEERING REPORT

**GLENRIDGE MIDDLE SCHOOL
5211 FLINTRIDGE DRIVE,
HYATTSVILLE, MD
(PROJECT NO. 382474)**



December 20, 2018

Prepared by:

**GEOTECH ENGINEERS, INC.
11890 Old Baltimore Pike, Suite U
Beltsville, MD 20705**

Prepared for:

**GRIMM AND PARKER ARCHITECTS
11720 Beltsville Drive, Suite 600
Calverton, MD 20705**



December 20, 2018

Grimm and Parker Architects
11720 Beltsville Dr., Suite 600
Calverton, MD 20705

Attn: Mr. Jonathan Hill, AIA, ALEP, LEED AP
Vice President



GEOTECH ENGINEERS, INC.

11890-U Old Baltimore Pike
Beltsville, MD 20705
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Fax. 301.937.9189

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Project: Geotechnical Engineering Report
Glenridge MS
5211 Flintridge Drive,
Hyattsville, MD
(Project No. 382474)

Dear Mr. Hill:

Submitted herewith is our geotechnical engineering report for the above project.

Services performed under this agreement included the drilling of thirty-four soil test borings, nine infiltration tests, soil laboratory tests and preparation of a geotechnical engineering report. Our report includes the following:

- a. General subsurface conditions within the site.
- b. Foundation recommendations for support of the proposed new school building, floor slabs and retaining walls. An allowable soil bearing pressure and estimated settlement are included.
- c. Earthwork requirements. Comments on the suitability of on-site materials for reuse as controlled fill.
- d. Recommendations on SWM facilities including infiltration rates.
- e. Recommended pavement section.
- f. Seismic soil classification.
- g. Lateral earth pressures
- h. Geotechnical engineering considerations during construction.

Services for environmental study, wetland and asbestos study, erosion control, cost or quantity estimates, slope stability analysis, construction inspection and other professional services not mentioned above are not included in the scope of this study.

Soil samples will be held until January 20, 2019 and then discarded unless other disposition is requested.

We appreciate the opportunity to be of service for this project. Please call the undersigned if you have any questions regarding the enclosed report.

Sincerely,

GEOTECH ENGINEERS, INC.

Andre Browne
Project Engineer



Paul Chung, P.E.
State of Maryland

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 13697, Expiration Date: 11-1-2019

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APPENDIX

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APPENDIX F	Lateral Earth Pressure
APPENDIX G	Test Boring Report Test Boring Logs, Boring Nos. B-1 to B-25 and I-1 to I-9 Boring Location Plan

**GEOTECHNICAL ENGINEERING REPORT
GLENRIDGE MIDDLE SCHOOL
5211 FLINTRIDGE DRIVE
HYATTSVILLE, MD**

1.0 SUMMARY OF RECOMMENDATIONS

The following is a summary of our findings and recommendations for this project:

- a. Test borings indicate that the site is generally underlain by existing fill (Stratum A) extending to 2.5 to 5.0 ft below grade. Stiff to hard clay (Stratum B) was encountered at the surface or below the existing fill, and extended to depths of 18.5 to 25 ft, maximum depth of borings. Firm sand layer (Stratum C) was encountered at various depths. The groundwater table was encountered during drilling in boring B-11 at a depth of about 19 ft. Overnight groundwater reading showed the groundwater in borings B-6 and B-13 at depths of 3.0 ft and 6.0 ft below grade. These water levels are believed to be trapped water and actual hydrostatic water table is estimated to be present at deeper elevations.
- b. Spread footings are considered feasible for support of the proposed school building. For the one and two-story common building, a soil bearing pressure of 3000 psf is recommended for footings founded on new controlled fill or on the medium stiff to hard clay of Stratum B.
- c. For the three-story academic wing, a soil bearing pressure of 4000 psf is recommended for footings founded on natural stiff clay of Stratum B. Lowering of footings are expected in the southeast portion of the section due to low existing grade.
- d. Perimeter footings founded on clay should be designed to accommodate for the moderate swelling potentials. Wall footings should be at least 20 inches wide for considerations of shear. Settlement of footings is not expected to exceed 1 inch with differential settlement not exceeding 1/2 inches.
- e. An earth-supported floor slab along with 4-inch gravel base is considered suitable. A modulus of subgrade reaction (Ks) of 150 kcf is recommended for the floor slab design.
- f. Soil site class D is recommended for the seismic design.
- g. Spread footings are considered feasible for support of the proposed retaining walls. A soil bearing pressure of 3000 psf is recommended for footings founded on the natural soils of Stratum B. We recommend that retaining walls be designed for a lateral earth pressure of 60H (psf) provided that porous backfill is placed. Footing drains and weep holes are recommended for the retaining wall to drain the collected water behind the wall. Basement walls may be designed for a soil pressure of 60H (psf).
- h. Proofrolling is recommended for the exposed subgrade after the topsoil and existing structures are removed. Upon successful proofrolling, the exposed subgrade should be compacted to 95 percent prior to placement of new fill.

- i. Controlled fill is expected to be required for the proposed construction. Materials classified as SC, SM, SP, SW, GM, GC, GP, GW or more granular soils per ASTM D-2487 are considered suitable for new controlled fill. Controlled fill should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D-1557. The excavated soils of Strata A and B are not considered suitable for reuse as controlled fill.
- j. The infiltration rates obtained from the in-situ tests and groundwater conditions are summarized as follows:

Boring No.	Test Depth (ft)	Infiltration Rate (in/hr)	Groundwater		Soil Description at Test Depth (ASTM/USDA)	Remark
			Depth Below Surface	Elevation		
I-1	13.0	0.24	Dry @ 15'	Dry @ El 191.6	Sandy Lean Clay/SANDY CLAY	Natural Soil
I-2	6.0	0.00	Dry @ 8'	Dry @ El 183.1	Lean Clay/CLAY	Natural Soil
I-3	8.0	0.00	Dry @ 10'	Dry @ El 180.8	Lean Clay/CLAY	Natural Soil
I-4	8.0	0.48	Dry @ 10'	Dry @ El 203.0	Sandy Lean Clay/SANDY CLAY	Natural Soil
I-5	8.0	0.24	Dry @ 10'	Dry @ El 203.5	Sandy Lean Clay/SANDY CLAY	Natural Soil
I-6	13.0	0.00	2.9'	El 195.4	Lean Clay/CLAY	Trapped Water
I-7	6.0	0.00	Dry @ 8'	Dry @ El 174.6	Lean Clay/CLAY	Natural Soil
I-8	10.0	0.00	Dry @ 12'	Dry @ El 180.9	Lean Clay/CLAY	Natural Soil
I-9	4.0	0.00	Dry @ 6'	Dry @ El 189.1	Lean Clay/CLAY	Natural Soil

Infiltration practice is not considered feasible due to low or zero infiltration rate obtained, probably because of the presence of stiff clay soils. The minimum infiltration rate required in MD Stormwater Design Manual is 0.52 in/hr. We recommend that underdrain pipe be installed in the proposed SWM facilities.

- k. Due to the presence of clay at the pavement subgrade, undercutting of 12 inches is recommended when encountered and undercutting should be replaced with controlled fill. Recommended pavement sections are as follows:

	Recommended Pavement Section (Untreated)	
	<u>Light Duty</u>	<u>Heavy Duty</u>
Asphalt Surface	1.5 inches	2.0 inches
Asphalt Base	3.0 inches	4.0 inches
Aggregate Basecourse	6.0 inches	8.0 inches

In lieu of undercutting, the clay subgrade may be treated with soil cement. A reduced pavement section may be used for the soil cement treated subgrade.

2.0 DESCRIPTION OF SITE AND PROPOSED CONSTRUCTION

The project site located at 5211 Flintridge Drive, Hyattsville, MD as shown in the vicinity map included in Appendix A. The site for the proposed development is the western half of the existing community park which includes multipurpose play fields, basketball court, tennis courts, parking lot, pond, restroom building and walking trail. The site is bordered by the existing residential lots to the north, west and south. Existing grade within the limits of the proposed construction downslopes generally from the west to the east with ground surface elevations ranging from approximately El 216 to El 180 based on the site plan provided to us.

Site development will consist of a new school building and its associated facilities including multipurpose play field, retaining walls, paved roadways and parking lots, paved play areas, and stormwater management (swm) facilities. Existing site facilities will be demolished during the course of the new construction.

The new school building will consist of a one and two-story section to the west and a three-story section to the east. The one and two-story section will be a common building with finished floor elevation planned at El 208.10. The three-story section will be an academic wing with finished floor elevation at El 193.43. Based on the information provided by Columbia Engineering, Inc., the anticipated maximum column and walls loads for the proposed school buildings are as follows:

<u>Section</u>	<u>Interior Col</u>	<u>Exterior Col</u>	<u>Bearing Wall</u>
1 Story	150 kips	100 kips	
2 Story	250 kips	150 kips	
3 Story	500 kips	350 kips	15 klf

To accommodate the new construction, several stormwater management SWM facilities are planned. Geothermal wells will be installed in the west of the proposed building. No other details of the proposed construction are available at the time of this reporting.

3.0 SUBSURFACE CONDITIONS

Thirty-four test borings (B-1 to B-25 and I-1 to I-9) were performed to explore the subsurface conditions of the site. The boring logs and locations are included in Appendix G. Soil profiles (Profile A-A to Profile F-F) were prepared to aid in engineering and are included in Appendix E.

Test borings and Standard Penetration Tests (SPT's) were conducted in accordance with ASTM D-1586. The number of hammer blows required to drive a split spoon 12 inches is defined as "N" value. Soil samples were classified in accordance with ASTM D-2487 as included in Appendix B.

3.1. Soil Stratification

Test borings indicate the following generalized soil strata underlying the proposed school building:

Ground Cover: Topsoil was encountered in all the borings. The thickness was approximately 4 inches to 9 inches.

Stratum A: Existing Fill. Consisted of lean clay. Encountered at the surface and extended to depths about 2.5 to 5.0 ft below grade. N values were in the range of 5 to 8, indicating soft to medium stiff consistency.

Stratum B: Reddish brown, brown, gray and red sandy lean CLAY (CL), lean CLAY (CL) and fat CLAY (CH). Encountered at the surface or below Stratum A and extended to depths of about 18.5 to 25 ft, the maximum depth of borings. N values ranged from 2 to greater than 50, indicating very soft to hard consistency.

Stratum C: Brown and gray silty SAND (SM) and sandy SILT (ML) with clay lenses. Interbedded within Stratum B and extended to 23.5 ft below grade. N values were in the range of 12 to 24, indicating firm to compact density.

3.2. Geology

The existing fill of Stratum A was probably placed during the development of the existing park. The on-site clay, sand and silt of Strata B and C are believed to belong to the Potomac group of Cretaceous age. Potomac group soils are generally considered to be highly preconsolidated due to the previous overburden which has since been eroded. Note that very soft soils were encountered at the upper portion of Stratum B in many borings, probably due to the thick topsoil cover and intense weathering near the surface.

3.3. Groundwater

The groundwater table was encountered during drilling in boring B-11 at a depth of about 19 ft. Overnight groundwater reading showed the groundwater in borings B-6 and B-13 at depths of 3.0 ft and 6.0 ft below grade or at El 197.1 and El 191.5. Considering that Borings B6 and B13 are located in the surface swale, the water tables recorded in these two borings are believed to be from the surface runoff.

The water reading data shown in the boring logs represents the hydrostatic groundwater conditions at the time of our investigation. Fluctuations in the groundwater table should, however, be expected depending on precipitation, evaporation and other similar factors.

4.0 LABORATORY TESTS

Laboratory tests were performed in our soil laboratory on several selected samples. The samples were classified according to ASTM D-2487 included in Appendix B. A summary of soil laboratory tests along

with gradation, Atterberg limits, moisture-density test and CBR test curves are included in Appendix C. The test results are summarized as follows:

Stratum B: Four samples recovered from this stratum were tested. The samples consisted of 0 percent gravel, 3.0 to 20.1 percent sand and 79.9 to 97.0 percent fines. Atterberg limit tests showed liquid limits (LL) of 33.8 to 69.7 and plasticity index (PI) of 14.4 to 46.5. The samples were classified as lean CLAY (CL), lean CLAY (CL) with sand and fat CLAY (CH).

Pavement Subgrade:

Two bulk samples recovered from B-23 and B-25 were tested for pavement analysis. The gradation tests indicated that the samples consisted 0.6 percent gravel, 12.9 to 25.2 percent sand and 74.2 to 86.5 percent fines. Atterberg limit tests showed liquid limits (LL) of 32.4 to 38.6 and plasticity index (PI) of 12.7 to 17.3. The samples were classified as lean CLAY (CL) and lean CLAY (CL) with sand. Moisture density relation tests (ASTM D-698) showed the maximum dry density of 110.5 pcf and 110.2 pcf at optimum moisture content of 17.2 % and 16.1 %, respectively. California Bearing Ratio (CBR) tests showed a CBR values of 1.8. The samples showed a swell of 3.73 and 3.94 percent after 4-day soaking, indicating moderate swelling potentials.

5.0 FOUNDATION RECOMMENDATIONS

Foundations for the proposed building have been evaluated for two sections: One- and two-story common section and three-story academic wing section. Our recommendations are detailed as follows:

5.1. One- and Two-Story Common Building

Considering the proposed finished first floor elevation of El 208.10, natural soils are anticipated to be encountered at the normal footing subgrade in the southern half of the building and new controlled fill in the northern half of the building. Spread footings are considered suitable and recommended for support of the one and two-story common building section.

Normal spread footings founded on new controlled fill or on stiff natural clay of Stratum B are recommended for support of the common building section. A soil bearing pressure of 3000 psf is recommended for design of foundation. A safety factor of at least 2.5 was considered against shear failure. Wall footings should be designed for the same soil bearing pressure. However, a minimum footing width of 20 inches should be maintained for considerations of puncher failure.

We have estimated the highest footing subgrade elevations for the proposed soil bearing pressure as follows:

<u>Boring No.</u>	<u>Elevation of Suitable Bearing Soils</u>	<u>Remarks</u>
B-1	El 203.5	Or on Controlled Fill
B-2	200	Or on Controlled Fill
B-3	194.5	Or on Controlled Fill
B-4	205	
B-5	204.5	Or on Controlled Fill
B-6	197.5	Or on Controlled Fill
B-7	213	
B-8	211	
B-9	200.5	Or on Controlled Fill

The above elevations are for design purposes only without considering the proposed floor elevation. Final footing subgrade, however, should be determined by the geotechnical engineer in the field during construction. Footing subgrade elevations between the borings may be determined by linear interpolation.

As shown in the above table, footings in the northern half and eastern end of the proposed 1 to 2 story common section may be founded on controlled fill. Footings founded on approved controlled fill may be designed for the same soil bearing pressure of 3000 psf.

Based on our laboratory tests, on-site clay is generally considered to have moderate swelling potentials. We recommend that perimeter footings be designed to accommodate the moderate swelling potentials.

Note that existing fill was encountered in borings B-3 and B-6. After topsoil is removed, the exposed subgrade should be compacted prior to placement of new fill as detailed in the "Earthwork Recommendations" section to provide firm support of the new fill.

Perimeter footings and footings in any unheated areas should be founded at least 2.5 feet below the final exterior grade for frost protection.

Footings may be stepped up or down. However, a maximum slope of 1.5H:1V should be maintained between the bottom edges of the adjacent footings.

Settlement of footings is not expected to exceed one inch and differential settlement between the adjacent footings should not exceed half this amount.

5.2. Three-Story Academic Wing

Relatively heavy column loads are anticipated for this section. Considering the proposed finished floor elevation of El 193.43, natural soils are anticipated to be encountered at or slightly below

the normal footing subgrade. Spread footings are considered suitable for support of the three-story academic wing.

Normal spread footings founded on the natural soil are recommended for support of the three-story academic wing. A soil bearing pressure of 4000 psf is recommended for footings founded on the stiff natural soils of Stratum B. Wall footings should be at least 18 inches wide for considerations of shear. A safety factor of at least 2.5 was considered against shear failure. Note that footings in this section should not be founded on new controlled fill.

Footings are expected to be founded on suitable bearing soils at or slightly below the normal depths. We have estimated the highest footing subgrade elevations for the proposed soil bearing pressure as follows:

<u>Boring No.</u>	<u>Elevation of Suitable Bearing Soils</u>	<u>Remarks</u>
B-10	El 194	
B-11	188	
B-12	192	
B-13	196.5	
B-14	190	
B-15	190	
B-16	192	
B-17	183.5	Exterior Grade at El 190
B-18	186	
B-19	191	
B-20	182.5	Exterior Grade at El 190

The above elevations are for design purposes only without considering the proposed floor elevation. Final footing subgrade, however, should be determined by the geotechnical engineer in the field during construction. Footing subgrade elevations between the borings may be determined by linear interpolation.

Settlement of footings is not expected to exceed 1 inch and differential settlement should not exceed half this amount.

5.3. Floor Slab

The floor slab is expected to be founded on natural soils and on new controlled fill. An earth supported floor slab is considered suitable and recommended. A 4-inch gravel base along with an 8-mil plastic is recommended as a moisture barrier. A modulus of subgrade reaction (Ks) of 150 kcf is recommended for the floor slab design.

Proofrolling and subgrade compaction are recommended for the floor slab subgrade. Our recommendations on subgrade preparation and controlled fill placement are included in the “Earthwork Recommendations” section.

5.4. Seismic

Subsoil conditions were evaluated for Seismic Site Class Definition per International Building Code (IBC). Soil borings show that the site is underlain by Potomac group of Cretaceous age. Local geology maps showed very stiff and compact Cretaceous age soils extend deep to the bedrock in this area. Based on our soil borings and the local geology map, we recommend that Soil “Site Class D” be used for seismic design.

Recommended design spectral acceleration parameters at short period and 1 second are as follows.

$$\begin{array}{lll} S_S = 0.118g, & S_{MS} = 0.189g, & S_{DS} = 0.126g \\ S_I = 0.051g, & S_{MI} = 0.122g, & S_{DI} = 0.081g \end{array}$$

6.0 RETAINING WALL

Retaining walls are planned at the transition between the two buildings. The site plans show that natural soils will be retained by retaining walls. Maximum height of the proposed retaining walls will be about 5 ft according to the site plan. Basement walls will also be constructed between the two sections.

Our recommendations for the retaining walls are detailed as follows:

6.1 Spread Footings

Spread footings are considered suitable for support of the proposed retaining walls. Spread footings founded on natural clay are recommended for support of the proposed retaining walls. Footings founded on the stiff clay of Stratum B may be designed for a soil bearing pressure of 3000 psf. We further recommend that footings be designed to accommodate the moderate swelling potentials. Footings are expected to be founded at a normal grade but should be at least 2.5 ft below the final finished grade for frost protection. Settlements should not exceed 1 inch.

6.2 Lateral Earth Pressures

We recommend that the retaining walls be designed to resist lateral earth pressures. A relatively high equivalent fluid pressure of 60H (psf) is recommended for the retaining walls with leveled backfill, provided that porous backfill is to be placed. A recommended lateral earth pressure diagram is included in Appendix F. Any surcharge occurring adjacent to the walls should also be considered as illustrated in the diagram. An increased soil pressure of 70H (psf) is recommended for the basement wall.

Based on the results of the soil borings, the following soil parameters may also be used for the design of the retaining walls:

-Internal friction angle:	15 degrees
-Unit weight (moist):	120 pcf
-Cohesion:	800 psf
-Coefficient of active pressure, K_a :	0.58
-Coefficient of passive pressure, K_p :	1.72
-Coefficient of at rest pressure, K_o :	0.74
-Friction factor between soil and concrete:	0.30

6.3 Backfill

Soils classified as SM, SP, SW or more granular soils in accordance with ASTM D-2487 are considered suitable for backfill. On-site excavated soils are not considered suitable for backfill due to the swelling potentials.

Backfill should be compacted to 90 percent per ASTM D-1557. A hand-operated tamper should be used for compaction of backfill within 5 ft from the wall to avoid overstressing.

6.4 Footing Drains

Normal footing drains are further recommended along the retaining walls as illustrated in the diagram in Appendix F. Weep holes (3-inch diameter) may also be installed at a typical 8 ft spacing at the bottom of the retaining walls.

7.0 INFILTRATION

7.1. Subsurface Conditions

Nine borings (I-1 and I-9) were drilled in the areas of the proposed stormwater management facilities. Samples were visually classified according to both ASTM and USDA. The following is a summary of subsurface condition at each proposed stormwater management structure:

I-1: Existing fill consisting of sandy lean clay and lean clay was encountered at the surface and extended to about 8.5 ft below the surface. The existing fill was underlain by naturally occurring sandy lean CLAY (USDA: Sandy Clay) extending to about 13.5 ft below the surface. The sandy lean clay was underlain by lean CLAY (USDA: Clay) extending to the bottom of the boring. The groundwater table was not recorded during drilling and 24 hrs after completion.

I-2: Naturally occurring lean CLAY (USDA: Clay) was encountered below the ground cover and extended to the bottom of the boring. The groundwater table was not recorded during drilling and 24 hrs after completion.

I-3: Naturally occurring lean CLAY (USDA: Clay) was encountered below the ground cover and extended to about 8.5 ft below the surface. The lean clay was underlain by sandy lean CLAY (USDA: Sandy Clay) extending to the bottom of the boring. The groundwater table was not recorded during drilling and 24 hrs after completion.

I-4: Naturally occurring sandy lean CLAY (USDA: Sandy Clay) was encountered below the ground cover and extended to the bottom of the boring. The groundwater table was not recorded during drilling and 24 hrs after completion.

I-5: Naturally occurring sandy lean CLAY (USDA: Sandy Clay) was encountered below the ground cover and extended to about 8.5 ft below the surface. The sandy lean clay was underlain by lean CLAY (USDA: Clay) extending to the bottom of the boring. The groundwater table was not recorded during drilling and 24 hrs after completion.

I-6: Naturally occurring lean CLAY (USDA: Clay) was encountered below the ground cover and extended to the bottom of the boring. The groundwater table was recorded at a depth of 2.9 ft below grade. This water level is considered to be trapped water from the previous rain.

I-7: Naturally occurring lean CLAY (USDA: Clay) was encountered below the ground cover and extended to the bottom of the boring. The groundwater table was not recorded during drilling and 24 hrs after completion.

I-8: Naturally occurring sandy lean CLAY (USDA: Sandy Clay) was encountered below the ground cover and extended to about 2.5 ft below the surface. The sandy lean clay was underlain by lean CLAY (USDA: Clay) extending to the bottom of the boring. The groundwater table was not recorded during drilling and 24 hrs after completion.

I-9: Naturally occurring sandy lean CLAY (USDA: Sandy Clay) was encountered below the ground cover and extended to about 2.5 ft below the surface. The sandy lean clay was underlain by clayey SAND (USDA: Sandy Clay) extending to about 4.0 ft below the surface. The clayey sand was underlain by lean CLAY (USDA: Clay) extending to the bottom of the boring. The groundwater table was not recorded during drilling and 24 hrs after completion.

7.2. Infiltration Tests

Infiltration tests were performed in the offset holes drilled adjacent to the test borings. The tests were generally conducted as follows:

- a. A 7-inch diameter borehole was prepared to a designated depth.

- b. A 4-inch diameter solid PVC casing was inserted and the borehole was presoaked overnight.
- c. On the next day, the hole was refilled with water.
- d. Water levels in the pipe were monitored.

The results of the in-situ infiltration test are included in Appendix D and are summarized as follows:

Boring No.	Test Depth (ft)	Infiltration Rate (in/hr)	Groundwater		Soil Description at Test Depth (ASTM/USDA)	Remark
			Depth Below Surface	Elevation		
I-1	13.0	0.24	Dry @ 15'	Dry @ El 191.6	Sandy Lean Clay/SANDY CLAY	Natural Soil
I-2	6.0	0.00	Dry @ 8'	Dry @ El 183.1	Lean Clay/CLAY	Natural Soil
I-3	8.0	0.00	Dry @ 10'	Dry @ El 180.8	Lean Clay/CLAY	Natural Soil
I-4	8.0	0.48	Dry @ 10'	Dry @ El 203.0	Sandy Lean Clay/SANDY CLAY	Natural Soil
I-5	8.0	0.24	Dry @ 10'	Dry @ El 203.5	Sandy Lean Clay/SANDY CLAY	Natural Soil
I-6	13.0	0.00	2.9'	El 195.4	Lean Clay/CLAY	Trapped Water
I-7	6.0	0.00	Dry @ 8'	Dry @ El 174.6	Lean Clay/CLAY	Natural Soil
I-8	10.0	0.00	Dry @ 12'	Dry @ El 180.9	Lean Clay/CLAY	Natural Soil
I-9	4.0	0.00	Dry @ 6'	Dry @ El 189.1	Lean Clay/CLAY	Natural Soil

7.3. Recommendations

Based on the above infiltration tests and subsurface investigation data, infiltration practice in the all the swm boring locations is not considered feasible due to low or zero infiltration rate obtained, probably because of the presence of clay. The minimum infiltration rate required in MD Stormwater Design Manual is 0.52 in/hr. We recommend that underdrain pipe be installed in the proposed SWM facilities.

Note that relatively high water table was recorded in boring I-6. Since this water table is likely to be the results of surface runoff trapped in the hole, no special treatments for the high water table are recommended in I-6 except for the drain pipes.

8.0 EARTHWORK RECOMMENDATIONS

Up to about 8 ft of controlled fill is expected to be placed in the building pad. The controlled fill should be placed and compacted as follows:

8.1. Subgrade Preparation

Topsoil, pavement, existing structures and other deleterious material present within the area of the proposed construction should be removed first. We recommend that the exposed subgrade be

proofrolled by a 20-ton loaded dump truck or other similar construction equipment. Proofrolling should be performed in a grid pattern to check the subgrade conditions in all directions. Proofrolling should be performed under the supervision of the geotechnical engineer and any significant pumping or rutting, if encountered, should be removed and replaced with controlled fill.

Upon completion of proofrolling, we recommend that the exposed subgrade be compacted to 95 percent per ASTM D-1557 prior to placement of any new fill. Overexcavated areas such as old utilities and structures, should be backfilled according to the recommendations as detailed herein.

8.2. Controlled Fill

Soils classified as SM, SC, SP, SW, GM, GC, GP, GW or more granular soils in accordance with ASTM D-2487 are considered suitable for controlled fill for support of the new school building and any site structures. For SC and GC soils, a plasticity index should not exceed 12 and a liquid limit 35. The proposed fill soil should have a maximum dry density of no less than 120 pcf. Recycled concrete should not be used under the building and SWM facilities but may be used for the paved areas.

All materials proposed for controlled fill should be tested and approved by the geotechnical engineer prior to use. The on-site excavated soils are not considered suitable for reuse as controlled fill and imported soils will be required for the same purpose. Moisture contents of the fill soils should be carefully monitored. Proposed fill soils should have a moisture content within 2 percent from the optimum moisture content.

Controlled fill should be placed in loose lifts not exceeding 8 inches in thickness and be compacted to at least 95 percent of the maximum dry density as determined by ASTM D-1557. New fill under the sidewalks and paved areas should also be compacted to at least 90 percent per the same standard.

9.0 PAVEMENT RECOMMENDATIONS

Proposed paved facilities included asphalt basketball court, parking lots, driveways and bus loop.

9.1. Subgrade Preparation

Based on the site plan provided, natural clay is expected to be encountered at the pavement subgrades except for some areas where controlled fill is to be placed. Laboratory tests indicate that on-site clay has moderate to high swelling potentials.

We recommend that the clay subgrade be undercut by at least 12 inches and undercutting be replaced with controlled fill or GAB in order to reduce potential problems due to swelling. Alternately, the top 12 inches of the clay subgrade may be chemically stabilized with soil cement to reduce to the swell potential and to provide firmer subbase for pavement support.

For soil cement, we recommend that cement content of 4 to 6 percent for the preliminary design purposes. A minimum compressive strength of 75 psi should be obtained at 7 day cure. Cement should be uniformly and thoroughly mixed with the on-site soils. Pulverizer or equivalent mixer should be used for mixing. Soil cement subgrade should be cured for 3 days before traffics are allowed. Soil cement should further be evaluated once this method is selected.

We recommend that pavement subgrade be proofrolled as recommended in the “Earthwork Recommendations” section. Any significant “pumping” areas and pockets of soft soil should be undercut and replaced with suitable controlled fill or GAB.

Upon successful proofrolling, the top 12 inches of pavement subgrade should be compacted to 95 percent according to ASTM D-1557.

9.2. Recommended Pavement Section

Paved play areas including the proposed basketball court are usually not designed to withstand repeated loads from vehicles. However, an occasional load application from maintenance or emergency vehicles were considered for our analysis. We assumed, for our study, that the proposed parking lots and driveways would be served for primarily lightly loaded passenger cars with occasional delivery trucks. Bus loop would be served for primarily loaded buses.

Two CBR tests were performed for pavement analysis and a laboratory CBR value of 1.8 was recorded. This value is generally considered to be very low for pavement support.

If the clay subgrade is to be undercut and replaced with non-swelling soils, the following pavement sections are recommended for the untreated subgrade:

	Recommended Pavement Section (Untreated)	
	<u>Light Duty</u>	<u>Heavy Duty</u>
Asphalt Surface	1.5 inches	2.0 inches
Asphalt Base	3.0 inches	4.0 inches
Aggregate Basecourse	6.0 inches	8.0 inches

GAB is recommended for the aggregate basecourse. The aggregate basecourse should be compacted to at least 95 percent per ASTM D-1557. The above light duty asphalt pavement section may apply for the passenger car parking lot while the heavy duty asphalt pavement section for the bus loop, fire lane and main driving lanes.

Due to the presence of swelling clay in the majority of the paved areas, the final pavement subgrade in cut sections be treated with soil cement in lieu of undercutting. A reduced pavement section may be used for the soil-cement subgrade as follows:

	Recommended Pavement Section (Soil Cement)	
	<u>Light Duty</u>	<u>Heavy Duty</u>
Asphalt Surface	1.5 inches	2.0 inches
Asphalt Base	2.5 inches	3.0 inches
Aggregate Basecourse(GAB)	4.0 inches	6.0 inches

For the dumpster pad, reinforced concrete slab is recommended to minimize any damages due to heavy concentrated load.

Prior to placement of asphalt pavement, GAB layer should be thoroughly proofrolled to detect any problem areas. "Pumping" GAB should be removed and replaced.

10.0 CONSTRUCTION CONSIDERATIONS

10.1. Spread Footing

Footing subgrade should be observed and tested by the geotechnical engineer to ascertain that footings are placed on a suitable subgrade as recommended herein. Care should be taken during excavation to minimize the disturbance of the bearing soils.

We recommend that footings be excavated and poured the same day in order to preclude ponding of any surface water in the footing excavation. Disturbed, frozen or softened soils should be removed prior to placement of concrete.

10.2. Floor Slab Subgrade

The floor subgrade should be observed by the geotechnical engineer prior to placement of the gravel base. Where the subgrade has been disturbed due to construction activity or other causes, the disturbed material should be replaced with crushed stone or controlled fill. Any trenches excavated for utility construction should be backfilled with controlled fill or crushed stone.

10.3. Earthwork

We recommend that earthwork be performed between May and November to minimize problems with weather and wet on-site soils. Pavement subgrade may be saturated in the wet season. Undercutting or soil cement may be required if earthwork is to be performed in the winter time or in the wet season. The contractor should be prepared for proper surface runoff during construction.

Pavement subgrade should be visually inspected by the geotechnical engineer for the presence of clay. If clay is encountered at the final design grade, the clay should be undercut by 12 inches and

be replaced with controlled fill or GAB, or alternately, the top 12 inches may be treated with soil cement.

10.4. Observation During Construction

The analysis and recommendations submitted in this report are based on the data obtained from the test borings performed at the locations indicated on the boring location plan. This report does not reflect any variations, which may present in the area between the borings. The nature and extent of variations between the borings may become evident only at the time of construction.

Careful monitoring during earthwork is essential for successful foundation work. It is recommended that **Geotech Engineers, Inc.** be retained as a quality control agency to perform professional observations for footing and floor subgrade, proofrolling and performing field density tests during placement of controlled fill.

11.0 GENERAL AND LIMITATIONS

It is recommended that we be provided the opportunity to review the final foundation plans and specifications to determine whether our recommendations have been properly applied.

Some variations in the soil conditions between the borings should be anticipated. An allowance should be established to account for additional costs that may be required during construction.

We have prepared this report for the use of the design professional for design purposes in accordance with generally accepted geotechnical engineering practices. No warranty, expressed or implied, is made as to the professional advice included in this report.

APPENDIX A

Vicinity Map



PROJECT NAME:

Glenridge MS
5211 Flintridge Drive,
Hyattsville, MD

TITLE:

Vicinity Map

PROJECT NO:

382474

APPENDIX B

Soil Classification Chart

**ASTM
USDA**

SOIL CLASSIFICATION CHART (ASTM D-2487)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification		
				Group Symbol	Group Name ^B	
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels	Clean Gravels	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	well-graded GRAVEL ^F	
	More than 50% of coarse fraction retained on No. 4 sieve	Less than 5% fines ^C	$Cu < 4$ and/or $1 > Cc > 3^E$	GP	poorly graded GRAVEL ^F	
		Gravels with Fines	Fines classify as ML or MH	GM	silty GRAVEL ^{F,G,H}	
	Sands 50 % or more of coarse fraction passes No. 4 sieve	More than 12 % fines ^C	Fines classify as CL or CH	GC	clayey GRAVEL ^{F,G,H}	
		Clean Sands	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	well-graded SAND ^I	
		Less than 5 % fines ^D	$Cu < 6$ and/or $1 > Cc > 3^E$	SP	poorly graded SAND ^I	
		Sands with Fines	Fines classify as ML or MH	SM	silty SAND ^{G,H,I}	
	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 ^J	CL	lean CLAY ^{K,L,M}
organic			$PI < 4$ or plots below "A" line ^J	ML	SILT ^{K,L,M}	
Silts and Clays Liquid limit 50 or more		inorganic	Liquid limit - oven dried	< 0.75	OL	organic CLAY ^{K,L,M,N}
			Liquid limit - not dried		OH	organic SILT ^{K,L,M,O}
		organic	PI plots on or above "A" line	CH	fat CLAY ^{K,L,M}	
			PI plots below "A" line	MH	elastic SILT ^{K,L,M}	
Highly Organic Soils		Primarily organic matter, dark in color, and organic odor	Liquid limit - oven dried	< 0.75	OH	organic CLAY ^{K,L,M,P}
			Liquid limit - not dried		PT	PEAT

^A Based on the material passing the 3-in. (75mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C 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

^D Sand 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

^E $Cu = D_{60} / D_{10}$ $Cc = (D_{30})^2 / (D_{10} \times D_{60})$

^F If soil contains ≥ 15 % sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains ≥ 15 % gravel, add "with gravel" to group name.

^J If Atterberg limits plot in hatched area, soil is a CL-ML, silty CLAY.

^K If soil contains 15 to 29 % plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains ≥ 30 % plus No. 200, predominantly sand, add "sandy" to group name.

^M If soil contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.

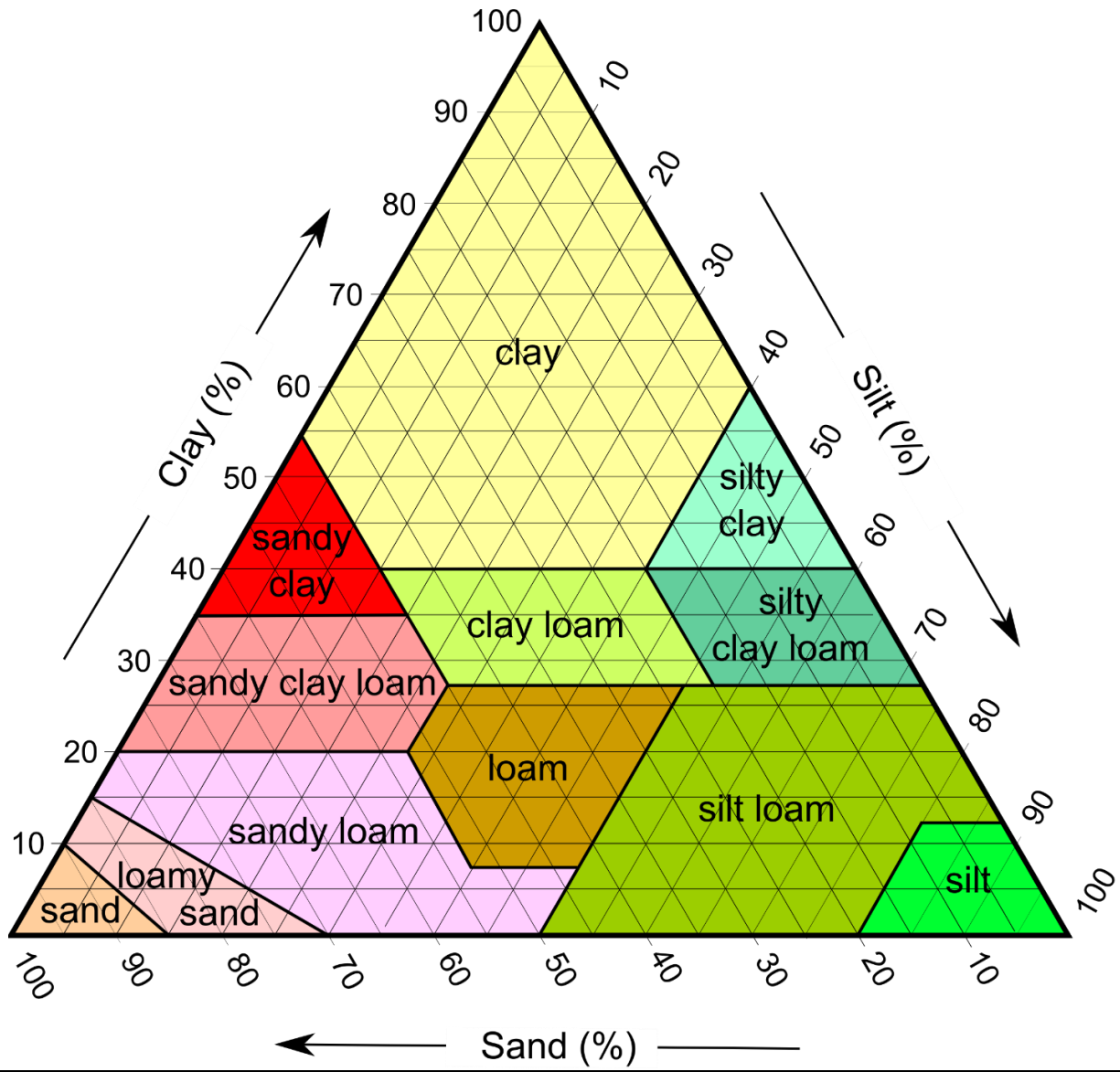
"Some" indicates presence of negligible amount of material.

RELATIVE DENSITY AND CONSISTENCY TABLE

The Standard Penetration Resistance values (N-values) and DCP values are used to describe the relative density of coarse-grained soils and the consistency of fine-grained soils as follows:

<u>Cohesionless Soil</u>			<u>Cohesive Soil</u>		
<u>N-value</u>	<u>DCP</u>	<u>Term</u>	<u>N-value</u>	<u>DCP</u>	<u>Term</u>
0 - 3	0 - 2	Very Loose	0 - 2	0 - 2	Very Soft
4 - 5	3 - 5	Loose	3 - 5	3 - 5	Soft
6 - 20	6 - 20	Firm	6 - 9	5 - 9	Medium Stiff
21 - 30	21+	Compact	10 - 15	10 - 20	Stiff
31+		Very Compact	16 - 30	21+	Very Stiff
			31+		Hard

USDA Soil Classification Chart



APPENDIX C

Summary of Soil Laboratory Tests

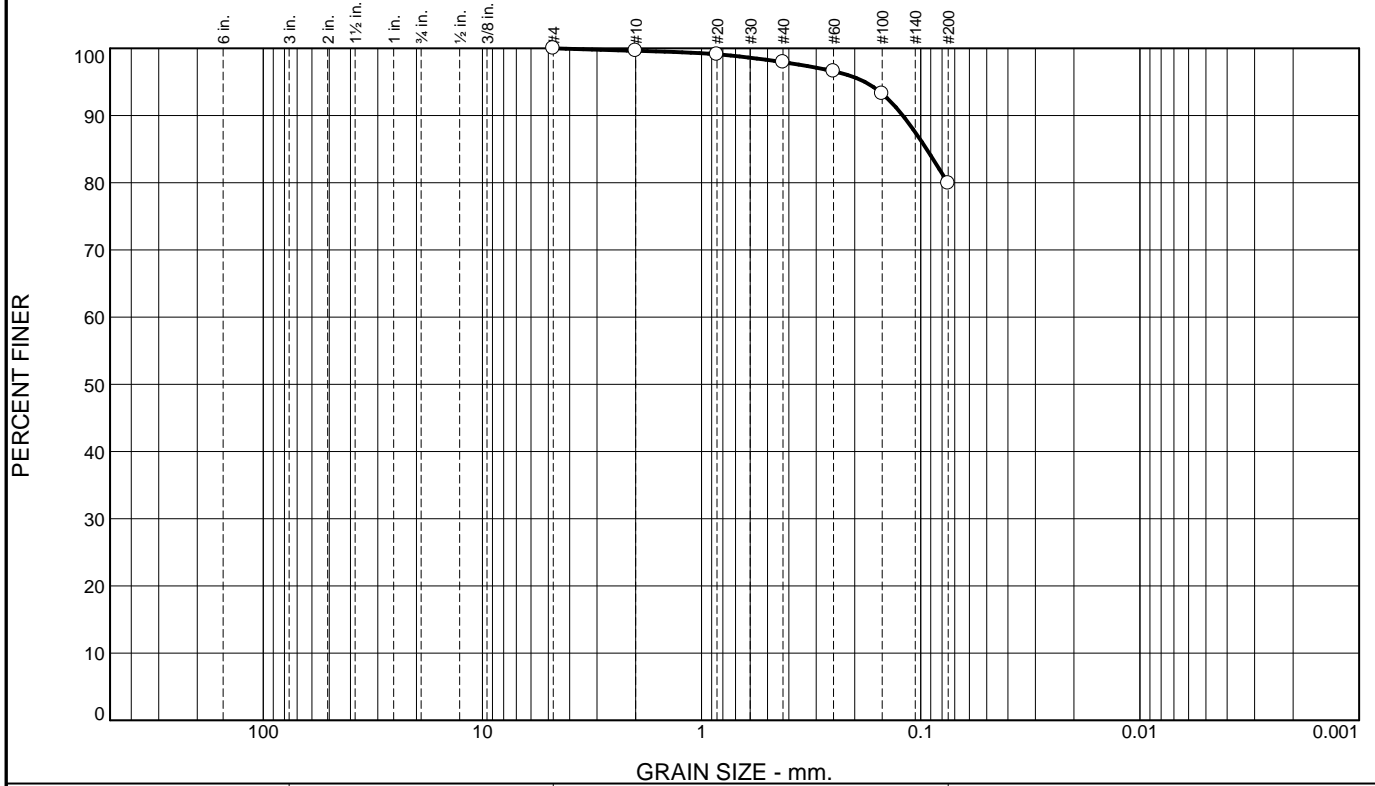
Gradation Test Reports (6)

Boring No./Depth	Soil Classification	Atterberg Limits			Moisture Content, %	Passing #200, %
		LL	PL	PI		
B-4 / 2.5'	Lean CLAY (CL) with sand	33.8	19.4	14.4	20.8	79.9
B-7 / 8.5'	Lean CLAY (CL) with sand	36.0	20.0	16.0	11.3	80.7
B-12 / 5.0'	Fat CLAY (CH)	69.7	23.2	46.5	22.9	97.0
B-19 / 5.0'	Lean CLAY (CL)	39.5	21.0	18.5	16.5	91.0
B-23 / 0.0' - 5.0'	Lean CLAY (CL) with sand	32.4	19.7	12.7	18.8	74.2
B-25 / 0.0' - 5.0'	Lean CLAY (CL)	38.6	21.3	17.3	17.8	86.5

Moisture-Density Test Reports (2) California Bearing Ratio (CBR) Test Reports (2)

Boring No. (Depth)	Moisture-Density Relation Test (ASTM D-1557)		CBR	
	Maximum Dry Density (pcf)	Optimum Moisture Contents (%)	Corrected CBR	Swelling (%)
B-23 (0.0-5.0')	110.5	17.2	1.8	3.73
B-25 (0.0-5.0')	110.2	16.1	1.8	3.94

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	1.7	18.0	79.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.6		
#20	99.1		
#40	97.9		
#60	96.6		
#100	93.3		
#200	79.9		

Material Description

Lean CLAY (CL) with sand

Atterberg Limits
 LL= 33.8 PI= 14.4

Coefficients
 D₈₅= 0.0941 D₆₀=
 D₅₀= D₃₀=
 D₁₀= C_u= C_c=

Classification
 USCS= CL AASHTO=

Remarks
 Moisture Content = 20.8%

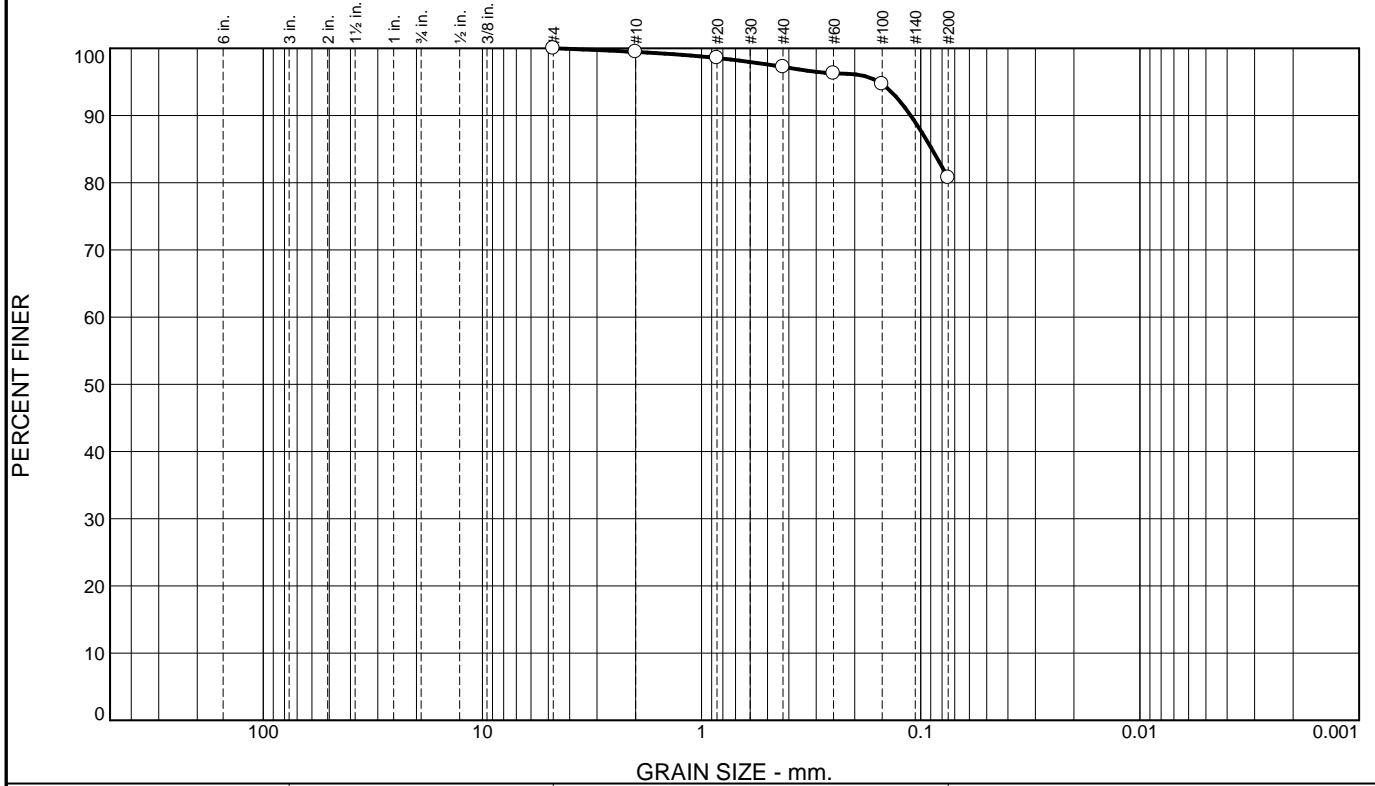
* (no specification provided)

Source of Sample: B-4 Depth: 2.5 Date: 12-11-18

GEOTECH ENGINEERS, INC.	Client: Grimm and Parker
Beltsville, Maryland	Project: Glenridge MS
	Project No: 382474
	Figure

Tested By: PP Checked By: AB

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	2.3	16.5	80.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.5		
#20	98.5		
#40	97.2		
#60	96.3		
#100	94.7		
#200	80.7		

Material Description

Lean CLAY (CL) with sand

Atterberg Limits
 PL= 20.0 LL= 36.0 PI= 16.0

Coefficients
 D₉₀= 0.1112 D₈₅= 0.0890 D₆₀=
 D₅₀= D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= CL AASHTO=

Remarks
 Moisture Content = 11.3%

* (no specification provided)

Source of Sample: B-7 Depth: 8.5

Date: 12-11-18

GEOTECH ENGINEERS, INC.

Client: Grimm and Parker
 Project: Glenridge MS

Beltsville, Maryland

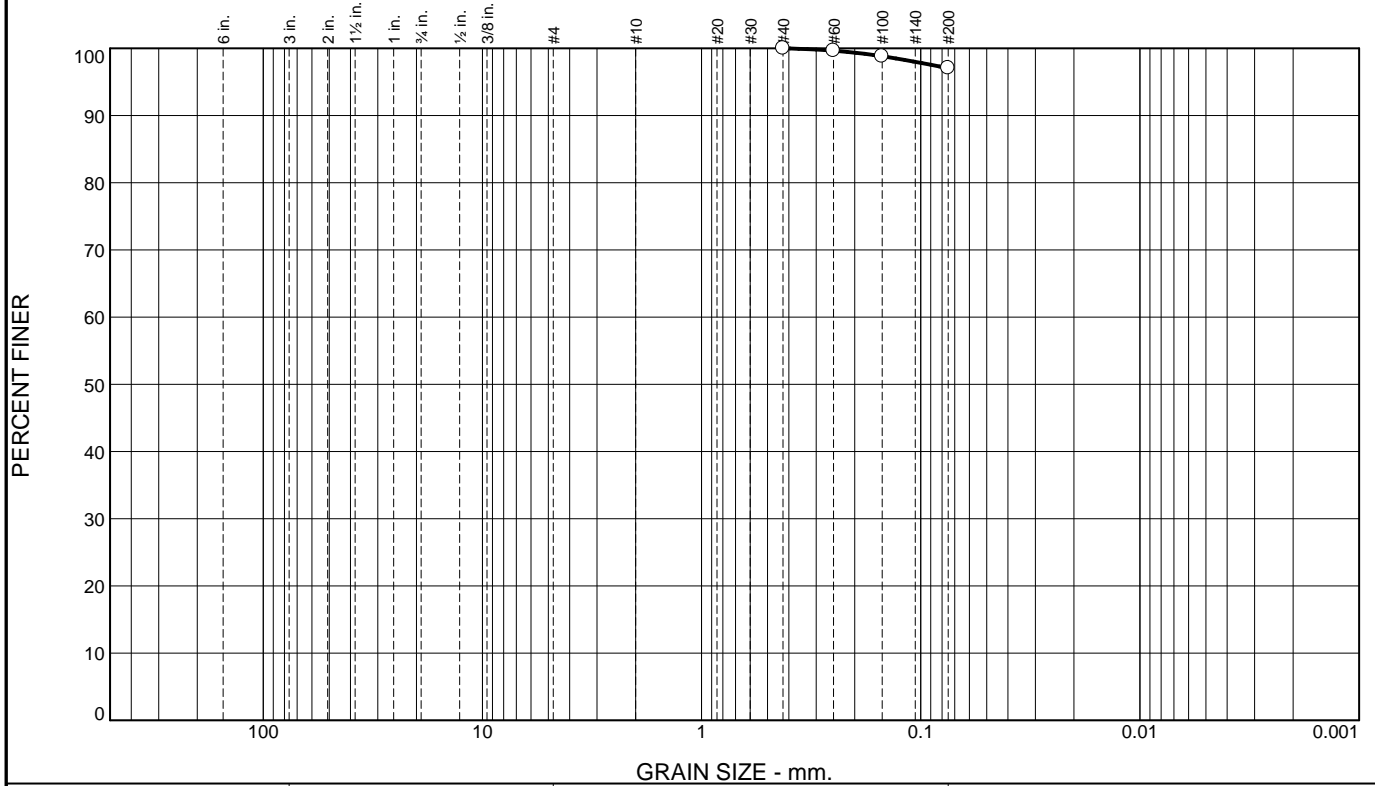
Project No: 382474

Figure

Tested By: PP

Checked By: AB

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	3.0	97.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#40	100.0		
#60	99.6		
#100	98.8		
#200	97.0		

Material Description

Fat CLAY (CH)

Atterberg Limits
 PL= 23.2 LL= 69.7 PI= 46.5

Coefficients
 D₉₀= D₈₅= D₆₀=
 D₅₀= D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= CH AASHTO=

Remarks
 Moisture Content = 22.9%

* (no specification provided)

Source of Sample: B-12 Depth: 5.0

Date: 12-11-18

GEOTECH ENGINEERS, INC.

Client: Grimm and Parker

Project: Glenridge MS

Beltsville, Maryland

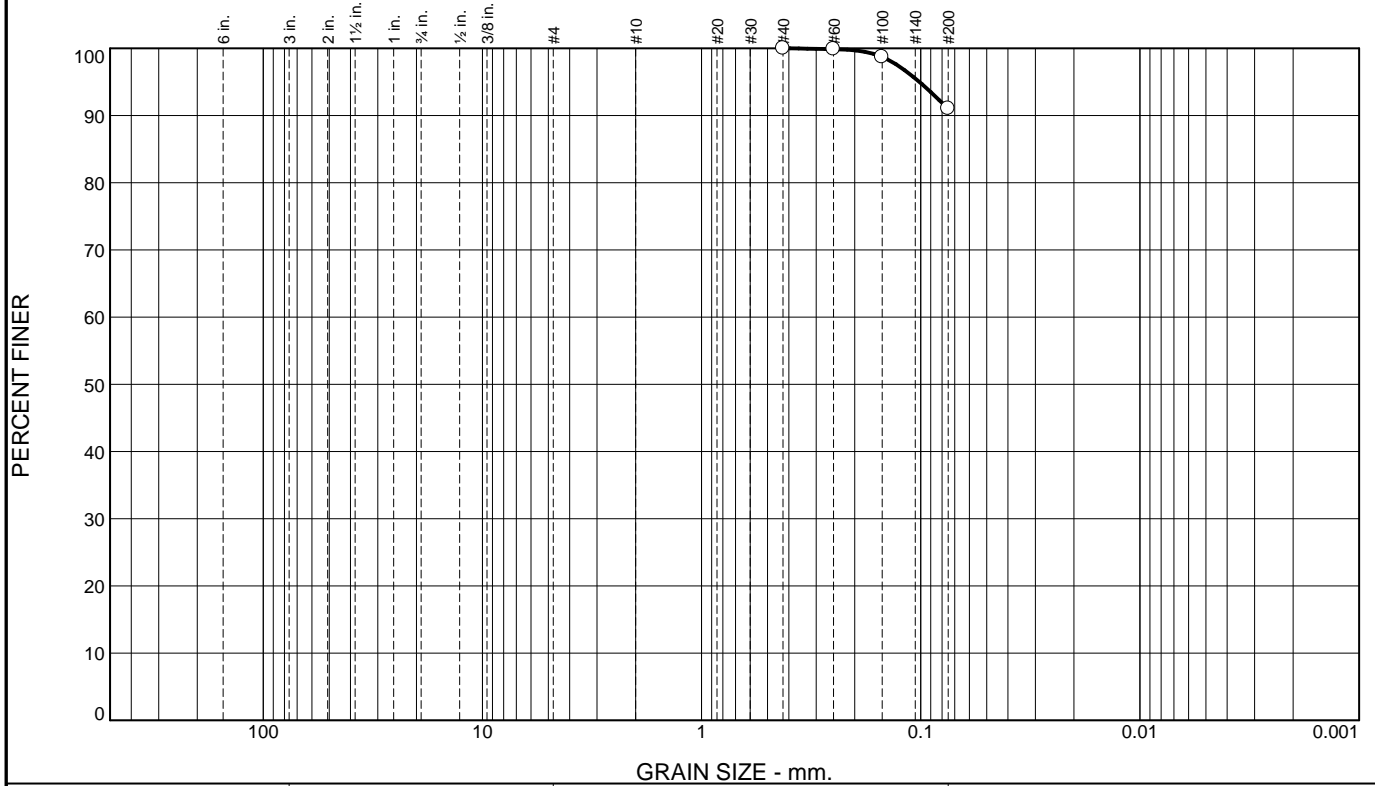
Project No: 382474

Figure

Tested By: PP

Checked By: AB

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	9.0	91.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#40	100.0		
#60	99.9		
#100	98.7		
#200	91.0		

Material Description

Lean CLAY (CL)

Atterberg Limits

PL= 21.0 LL= 39.5 PI= 18.5

Coefficients

D₉₀= D₈₅= D₆₀=
D₅₀= D₃₀= D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Moisture Content = 16.5%

* (no specification provided)

Source of Sample: B-19 Depth: 5.0

Date: 12-11-18

GEOTECH ENGINEERS, INC.

Client: Grimm and Parker

Project: Glenridge MS

Beltsville, Maryland

Project No: 382474

Figure

Tested By: PP

Checked By: AB

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	1.0	4.5	19.7	74.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.4		
#10	98.4		
#20	97.1		
#40	93.9		
#60	90.3		
#100	86.2		
#200	74.2		

Material Description

Lean CLAY (CL) with sand

Atterberg Limits
 LL= 32.4 PI= 12.7

Coefficients
 D₉₀= 0.2403 D₈₅= 0.1366
 D₅₀= D₃₀= D₆₀=
 D₁₀= C_u= C_c=

Classification
 USCS= CL AASHTO=

Remarks
 Moisture Content = 18.8%

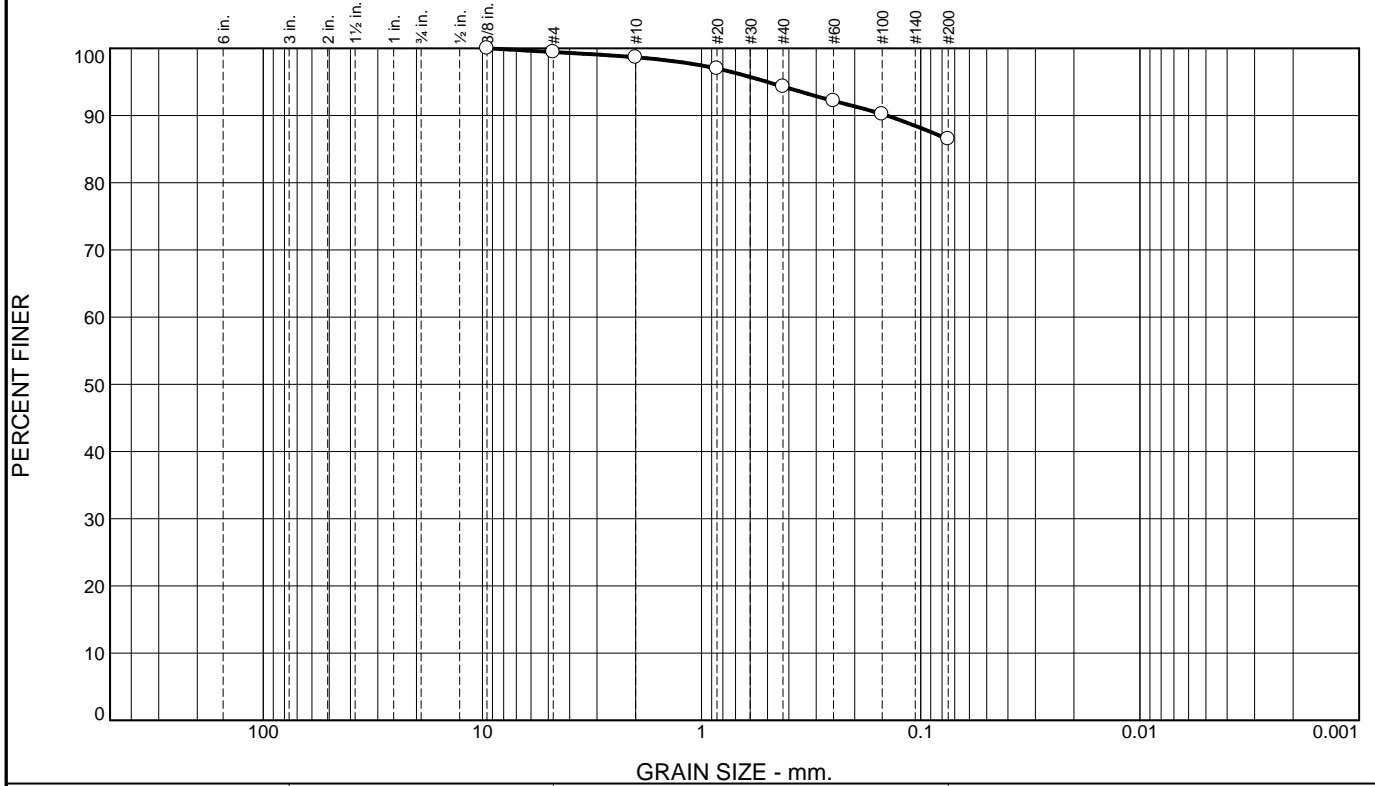
* (no specification provided)

Source of Sample: B-23 Depth: 0 ft - 5 ft Date: 12-11-18

GEOTECH ENGINEERS, INC.	Client: Grimm & Parker Project: Glenridge MS	
Beltsville, Maryland	Project No: 382474	Figure

Tested By: PP Checked By: AB

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	0.7	4.4	7.8	86.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.4		
#10	98.7		
#20	97.0		
#40	94.3		
#60	92.2		
#100	90.2		
#200	86.5		

Material Description

Lean CLAY (CL)

Atterberg Limits
 PL= 21.3 LL= 38.6 PI= 17.3

Coefficients
 D₉₀= 0.1434 D₈₅= D₆₀=
 D₅₀= D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= CL AASHTO=

Remarks
 Moisture Content = 17.8%

* (no specification provided)

Source of Sample: B-25 Depth: 0 ft - 5 ft

Date: 12-11-18

GEOTECH ENGINEERS, INC.	Client: Grimm & Parker	Project: Glenridge MS
Beltsville, Maryland	Project No: 382474	Figure

Tested By: PP Checked By: AB

MOISTURE - DENSITY TEST REPORT

SAMPLE NO./ SOURCE: B-23 / 0.0 - 5.0'

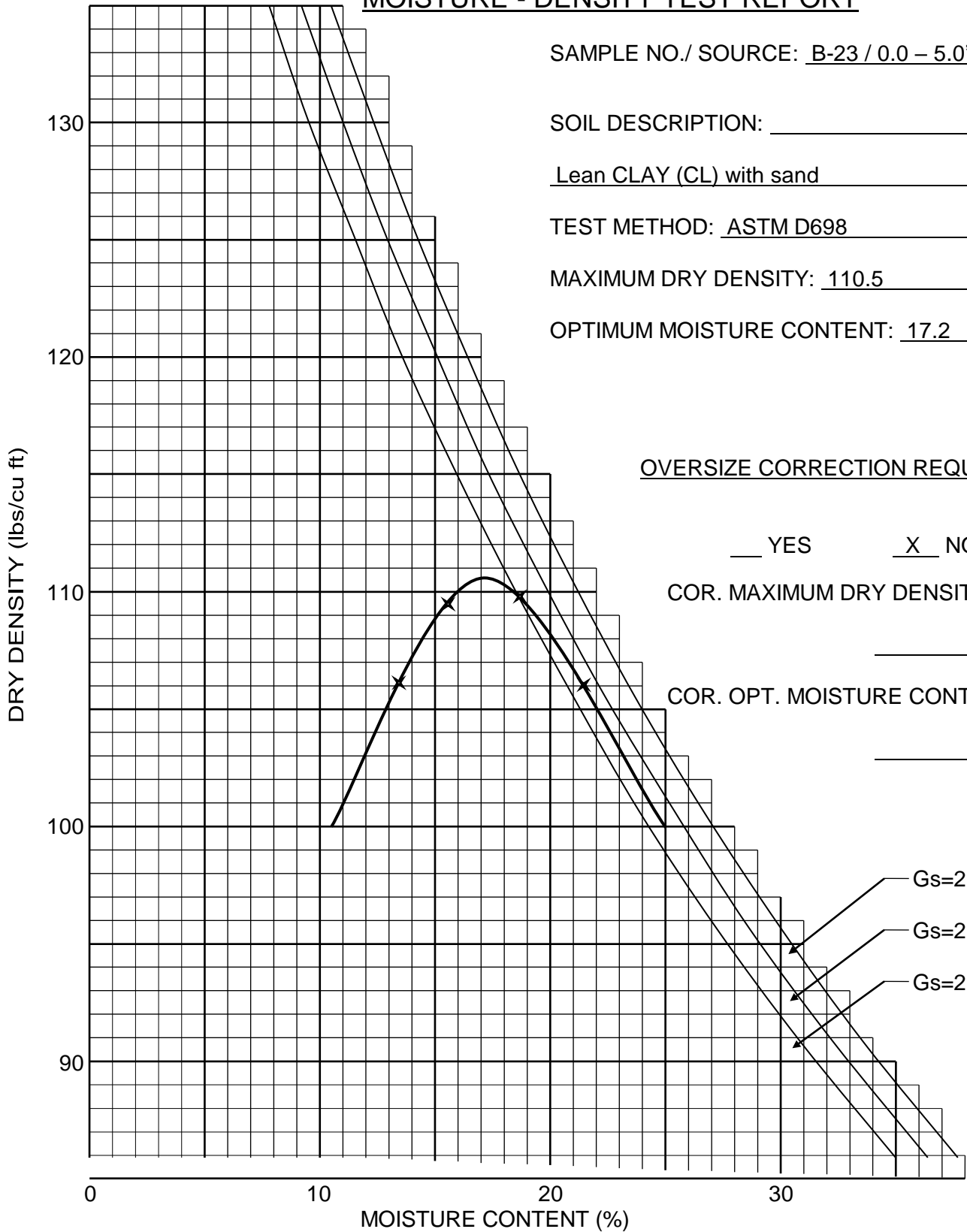
SOIL DESCRIPTION: _____

Lean CLAY (CL) with sand

TEST METHOD: ASTM D698

MAXIMUM DRY DENSITY: 110.5 pcf

OPTIMUM MOISTURE CONTENT: 17.2 %



OVERSIZE CORRECTION REQUIRED

YES NO

COR. MAXIMUM DRY DENSITY: _____ pcf

COR. OPT. MOISTURE CONTENT: _____ %

Gs=2.80

Gs=2.70

Gs=2.60

PROJECT NAME: Glenridge Middle School
Hyattsville, MD

DATE: 12/12/2018

PROJECT NO: 382474

MOISTURE - DENSITY TEST REPORT

SAMPLE NO./ SOURCE: B-25 / 0.0 - 5.0'

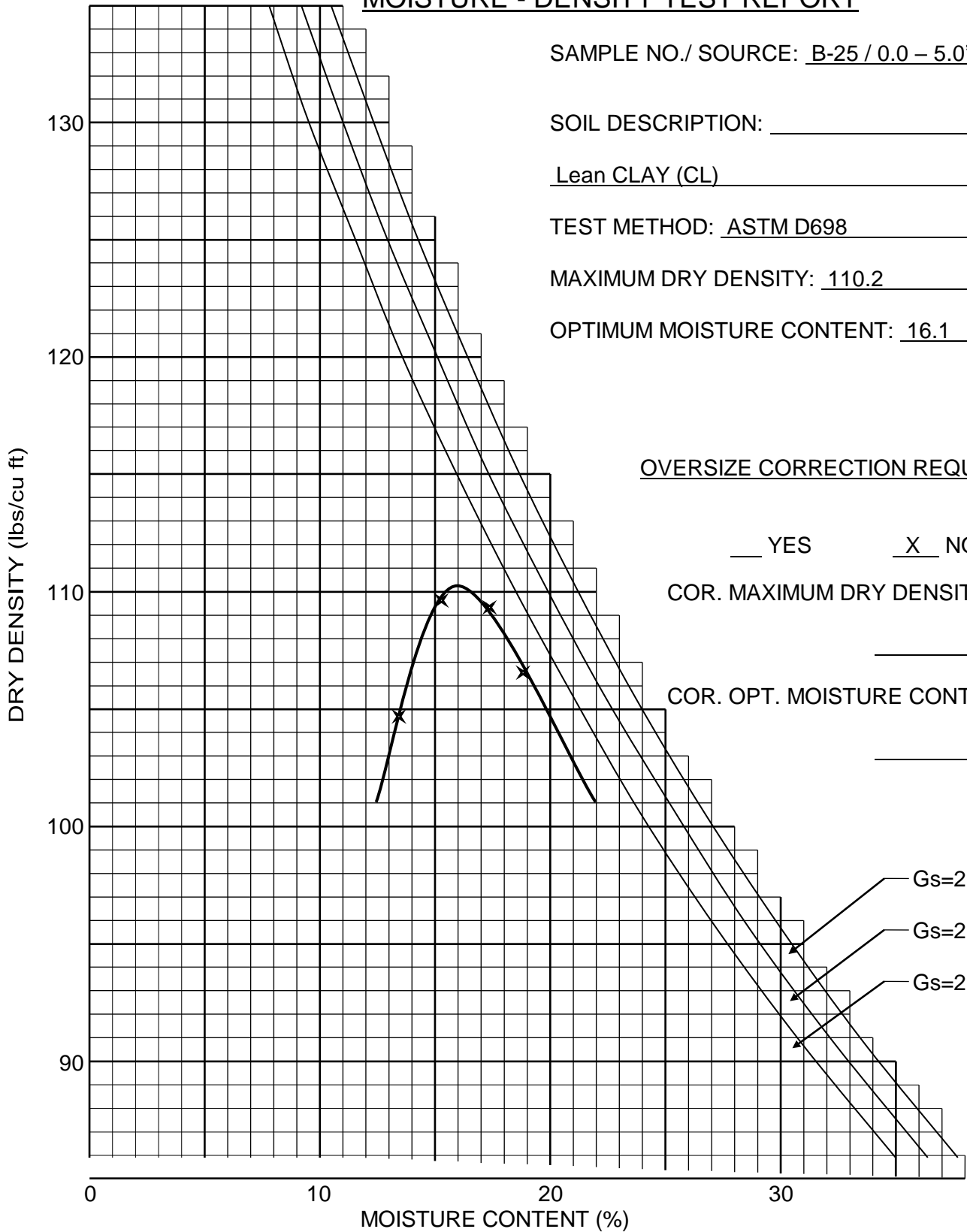
SOIL DESCRIPTION: _____

Lean CLAY (CL)

TEST METHOD: ASTM D698

MAXIMUM DRY DENSITY: 110.2 pcf

OPTIMUM MOISTURE CONTENT: 16.1 %



OVERSIZE CORRECTION REQUIRED

YES NO

COR. MAXIMUM DRY DENSITY: _____ pcf

COR. OPT. MOISTURE CONTENT: _____ %

Gs=2.80

Gs=2.70

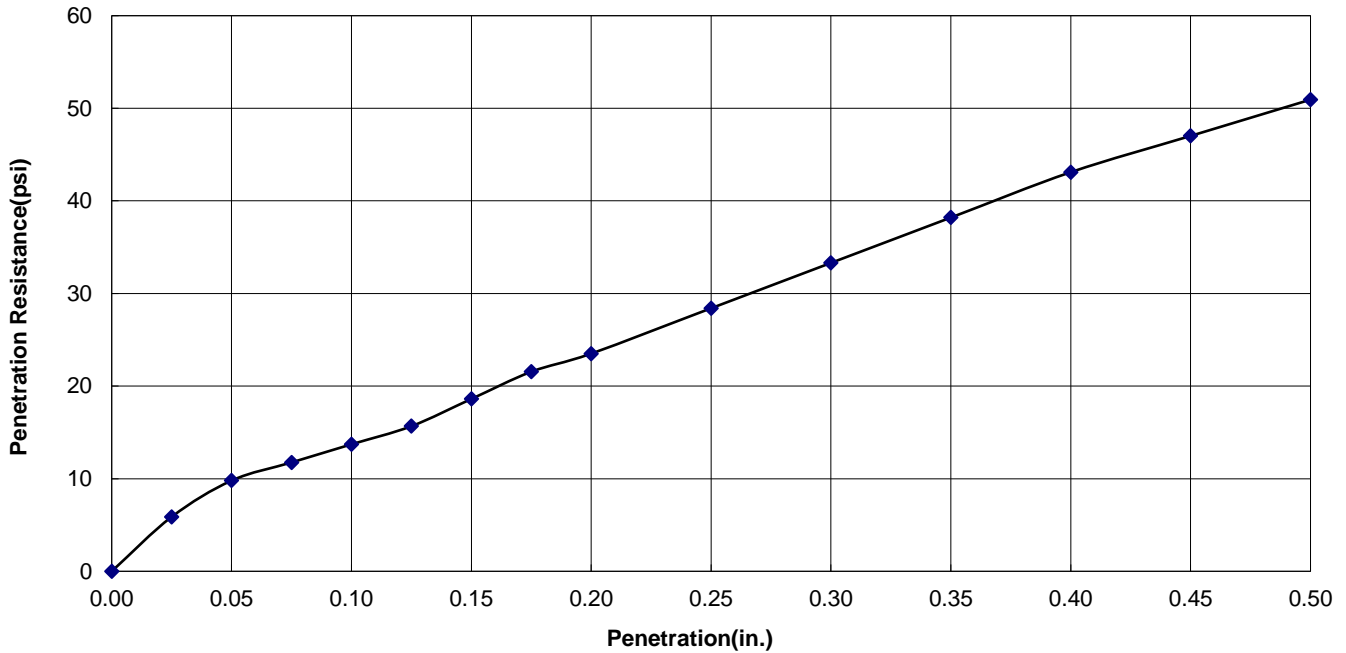
Gs=2.60

PROJECT NAME: Glenridge Middle School
Hyattsville, MD

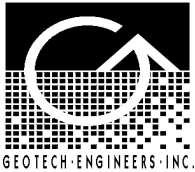
DATE: 12/12/2018

PROJECT NO: 382474

Penetration Results



Point	Molded (ASTMD-698)			Soaked			Corrected CBR, % 0.1 in	Line Correction	Pen. Sur. lbs	Swell %
	Density	%Max	%Moist	Density	%Max	%Moist				
1	116.2	105.2%	12.9%	109.6	99.2%	27.8%	1.8	0.0000	10	3.73%
Specimen Identification				Classification			Maximum Dry Density (pcf)	Optimum Moisture (%)	CBR 0.1	
B-23 / 0.0 - 5.0'				Reddish brown lean CLAY (CL)			110.5	17.2%	1.8	

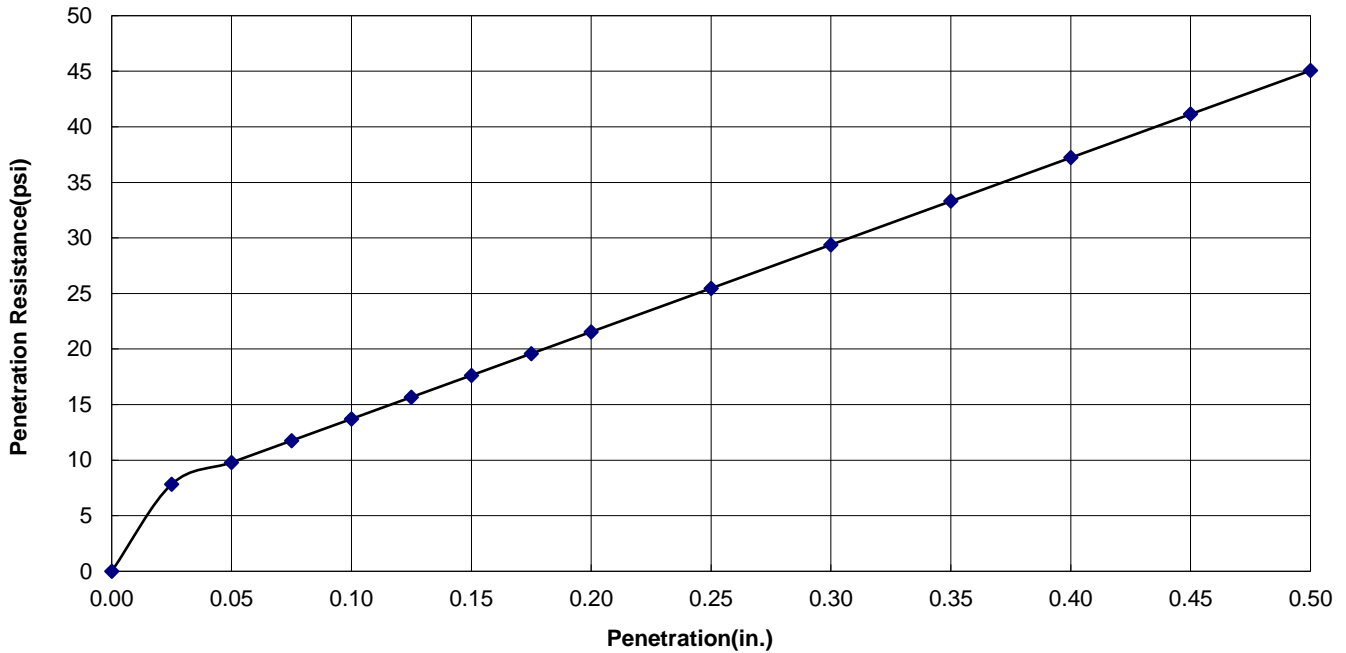


Geotech Engineers, Inc.
 11890-U Old Baltimore Pike
 Beltsville, MD 20705
 Telephone: (301) 937-9227
 Fax: (301) 937-9189

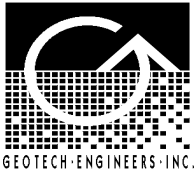
CALIFORNIA BEARING RATIO TEST (ASTM D-1883)

Project: Glenridge MS
 Location: Hyattsville, MD
 Number: 382474

Penetration Results



Point	Molded (ASTMD-698)			Soaked			Corrected CBR, % 0.1 in	Line Correction	Pen. Sur. lbs	Swell %
	Density	%Max	%Moist	Density	%Max	%Moist				
1	114.1	103.6%	15.0%	108.4	98.4%	29.1%	1.8	0.0000	10	3.94%
Specimen Identification				Classification			Maximum Dry Density (pcf)	Optimum Moisture (%)	CBR 0.1	
B-25 / 0.0 - 5.0'				Brown lean CLAY (CL)			110.2	16.1%	1.8	



Geotech Engineers, Inc.
 11890-U Old Baltimore Pike
 Beltsville, MD 20705
 Telephone: (301) 937-9227
 Fax: (301) 937-9189

CALIFORNIA BEARING RATIO TEST (ASTM D-1883)

Project: Glenridge MS
 Location: Hyattsville, MD
 Number: 382474

APPENDIX D

Infiltration Test Reports

Test Nos: I-1 and I-9

Hole Preparation and Testing Procedures:

- a. A 7-inch diameter borehole was prepared to the designated depth.
- b. A 4-inch diameter solid PVC casing was inserted, and the borehole was presoaked overnight.
- c. On the next day, the hole was refilled with water.
- d. Water levels in the pipe were monitored. Water levels were measured from the top of the pvc pipe.

INFILTRATION TEST REPORT

GEOTECH ENGINEERS, INC.

PROJECT NAME:	Glenridge MS	PROJECT NO: 382474
LOCATION:	Hyattsville, MD	HOLE NO: I-1
PIPE DIAMETER:	4"	TEST DEPTH: 13.0'
PRE-SOAKING DATE:	11/27/2018	TEST DATE: 11/28/2018

TIME	TIME ELAPSED	WATER DEPTH	DROP IN LEVEL	INFILTRATION RATE	REMARKS
	min.	ft	in	in/hr	
11:34	0	12.21			
12:04	30	13.21	12.00	24.00	
12:34	60	13.36	1.80	3.60	
13:04	90	13.46	1.20	2.40	
13:34	120	13.53	0.84	1.68	
14:04	150	13.57	0.48	0.96	
14:34	180	13.60	0.36	0.72	
15:04	210	13.62	0.24	0.48	
15:34	240	13.63	0.12	0.24	

Remarks:

Performed by: WJ

Infiltraton Rate : **0.24** in/hr

INFILTRATION TEST REPORT

GEOTECH ENGINEERS, INC.

PROJECT NAME:	Glenridge MS	PROJECT NO: 382474
LOCATION:	Hyattsville, MD	HOLE NO: I-2
PIPE DIAMETER:	4"	TEST DEPTH: 6.0'
PRE-SOAKING DATE:	11/29/2018	TEST DATE: 11/30/2018

TIME	TIME ELAPSED	WATER DEPTH	DROP IN LEVEL	INFILTRATION RATE	REMARKS
	min.	ft	in	in/hr	
13:07	0	8.59			
13:37	30	8.92	3.96	7.92	
14:07	60	8.92	0.00	0.00	
14:37	90	8.92	0.00	0.00	
15:07	120	8.92	0.00	0.00	

Remarks:

Performed by: WJ

Infiltraton Rate : **0.00** in/hr

INFILTRATION TEST REPORT

GEOTECH ENGINEERS, INC.

PROJECT NAME:	Glenridge MS	PROJECT NO: 382474
LOCATION:	Hyattsville, MD	HOLE NO: I-3
PIPE DIAMETER:	4"	TEST DEPTH: 8.0'
PRE-SOAKING DATE:	11/29/2018	TEST DATE: 11/30/2018

TIME	TIME ELAPSED	WATER DEPTH	DROP IN LEVEL	INFILTRATION RATE	REMARKS
	min.	ft	in	in/hr	
13:05	0	8.66			
13:35	30	8.94	3.36	6.72	
14:05	60	8.96	0.24	0.48	
14:35	90	8.96	0.00	0.00	
15:05	120	8.96	0.00	0.00	
15:35	150	8.96	0.00	0.00	
16:05	180	8.96	0.00	0.00	

Remarks:

Performed by: WJ

Infiltration Rate : **0.00** in/hr

INFILTRATION TEST REPORT

GEOTECH ENGINEERS, INC.

PROJECT NAME:	Glenridge MS	PROJECT NO: 382474
LOCATION:	Hyattsville, MD	HOLE NO: I-4
PIPE DIAMETER:	4"	TEST DEPTH: 8.0'
PRE-SOAKING DATE:	11/27/2018	TEST DATE: 11/28/2018

TIME	TIME ELAPSED	WATER DEPTH	DROP IN LEVEL	INFILTRATION RATE	REMARKS
	min.	ft	in	in/hr	
11:31	0	8.45			
12:01	30	8.53	0.96	1.92	
12:31	60	8.56	0.36	0.72	
13:01	90	8.62	0.72	1.44	
13:31	120	8.64	0.24	0.48	
14:01	150	8.66	0.24	0.48	
14:31	180	8.69	0.36	0.72	
15:01	210	8.73	0.48	0.96	
15:31	240	8.75	0.24	0.48	

Remarks:

Performed by: WJ

Infiltraton Rate : **0.48** in/hr

INFILTRATION TEST REPORT

GEOTECH ENGINEERS, INC.

PROJECT NAME:	Glenridge MS	PROJECT NO:	382474
LOCATION:	Hyattsville, MD	HOLE NO:	I-5
PIPE DIAMETER:	4"	TEST DEPTH:	8.0'
PRE-SOAKING DATE:	11/27/2018	TEST DATE:	11/28/2018

TIME	TIME ELAPSED	WATER DEPTH	DROP IN LEVEL	INFILTRATION RATE	REMARKS
	min.	ft	in	in/hr	
11:30	0	9.38			
12:00	30	9.45	0.84	1.68	
12:30	60	9.48	0.36	0.72	
13:00	90	9.55	0.84	1.68	
13:30	120	9.56	0.12	0.24	
14:00	150	9.57	0.12	0.24	
14:30	180	9.60	0.36	0.72	
15:00	210	9.62	0.24	0.48	
15:30	240	9.63	0.12	0.24	

Remarks:

Performed by: WJ

Infiltraton Rate : **0.24** in/hr

INFILTRATION TEST REPORT

GEOTECH ENGINEERS, INC.

PROJECT NAME:	Glenridge MS	PROJECT NO: 382474
LOCATION:	Hyattsville, MD	HOLE NO: I-6
PIPE DIAMETER:	4"	TEST DEPTH: 13.0'
PRE-SOAKING DATE:	11/29/2018	TEST DATE: 11/30/2018

TIME	TIME ELAPSED	WATER DEPTH	DROP IN LEVEL	INFILTRATION RATE	REMARKS
	min.	ft	in	in/hr	
13:00	0	11.12			
13:30	30	11.21	1.08	2.16	
14:00	60	11.21	0.00	0.00	
14:30	90	11.21	0.00	0.00	
15:00	120	11.21	0.00	0.00	
15:30	150	11.21	0.00	0.00	

Remarks:

Performed by: WJ

Infiltration Rate : **0.00** in/hr

INFILTRATION TEST REPORT

GEOTECH ENGINEERS, INC.

PROJECT NAME:	Glenridge MS	PROJECT NO: 382474
LOCATION:	Hyattsville, MD	HOLE NO: I-7
PIPE DIAMETER:	4"	TEST DEPTH: 6.0'
PRE-SOAKING DATE:	11/27/2018	TEST DATE: 11/28/2018

TIME	TIME ELAPSED	WATER DEPTH	DROP IN LEVEL	INFILTRATION RATE	REMARKS
	min.	ft	in	in/hr	
12:33	0	7.05			
13:03	30	7.13	0.96	1.92	
13:33	60	7.13	0.00	0.00	
14:03	90	7.13	0.00	0.00	
14:33	120	7.13	0.00	0.00	
15:03	150	7.13	0.00	0.00	

Remarks:

Performed by: WJ

Infiltration Rate : **0.00** in/hr

INFILTRATION TEST REPORT

GEOTECH ENGINEERS, INC.

PROJECT NAME:	Glenridge MS	PROJECT NO: 382474
LOCATION:	Hyattsville, MD	HOLE NO: I-8
PIPE DIAMETER:	4"	TEST DEPTH: 10.0'
PRE-SOAKING DATE:	11/29/2018	TEST DATE: 11/30/2018

TIME	TIME ELAPSED	WATER DEPTH	DROP IN LEVEL	INFILTRATION RATE	REMARKS
	min.	ft	in	in/hr	
12:31	0	10.69			
13:01	30	10.71	0.24	0.48	
13:31	60	10.72	0.12	0.24	
14:01	90	10.72	0.00	0.00	
14:31	120	10.72	0.00	0.00	
15:01	150	10.72	0.00	0.00	
15:31	180	10.72	0.00	0.00	

Remarks:

Performed by: WJ

Infiltration Rate : **0.00** in/hr

INFILTRATION TEST REPORT

GEOTECH ENGINEERS, INC.

PROJECT NAME:	Glenridge MS	PROJECT NO: 382474
LOCATION:	Hyattsville, MD	HOLE NO: I-9
PIPE DIAMETER:	4"	TEST DEPTH: 4.0'
PRE-SOAKING DATE:	11/29/2018	TEST DATE: 11/30/2018

TIME	TIME ELAPSED	WATER DEPTH	DROP IN LEVEL	INFILTRATION RATE	REMARKS
	min.	ft	in	in/hr	
12:30	0	4.11			
13:00	30	4.14	0.36	0.72	
13:30	60	4.14	0.00	0.00	
14:00	90	4.14	0.00	0.00	
14:30	120	4.14	0.00	0.00	
15:00	150	4.14	0.00	0.00	

Remarks:

Performed by: WJ

Infiltraton Rate : **0.00** in/hr

APPENDIX E

Generalized Soil Profile

Profile A-A

Profile B-B

Profile C-C

Profile D-D

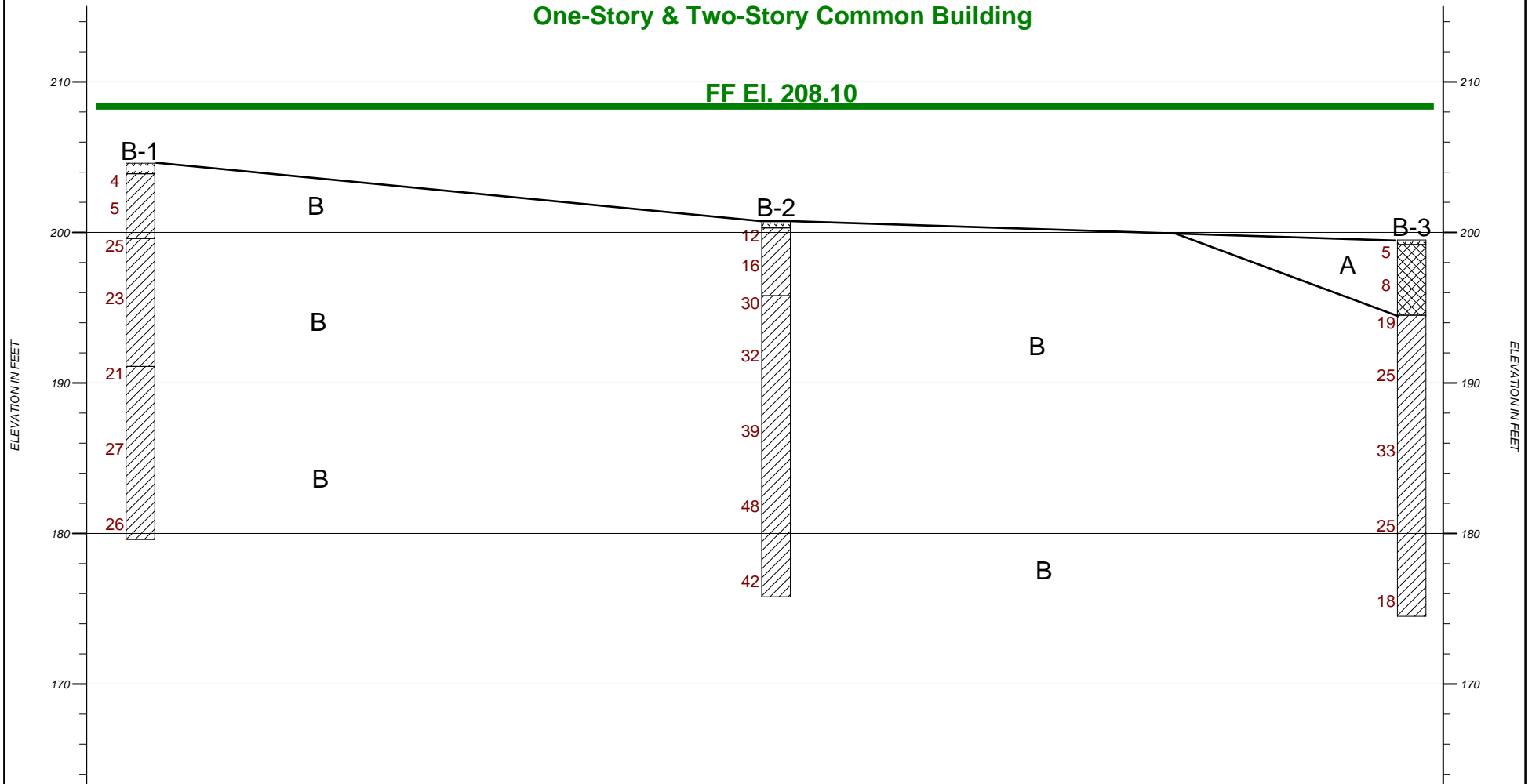
Profile E-E

Profile F-F

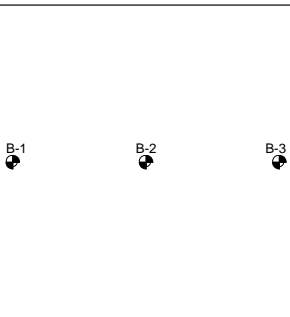
1. Distance between the borings shown on the profiles is approximate.
2. The generalized soil profiles are our interpretation of the test boring data and should not be used as a part of the contract documents.
3. See Appendix H "Boring Location Plan" for soil profile lines.

One-Story & Two-Story Common Building

FF El. 208.10



Plan View

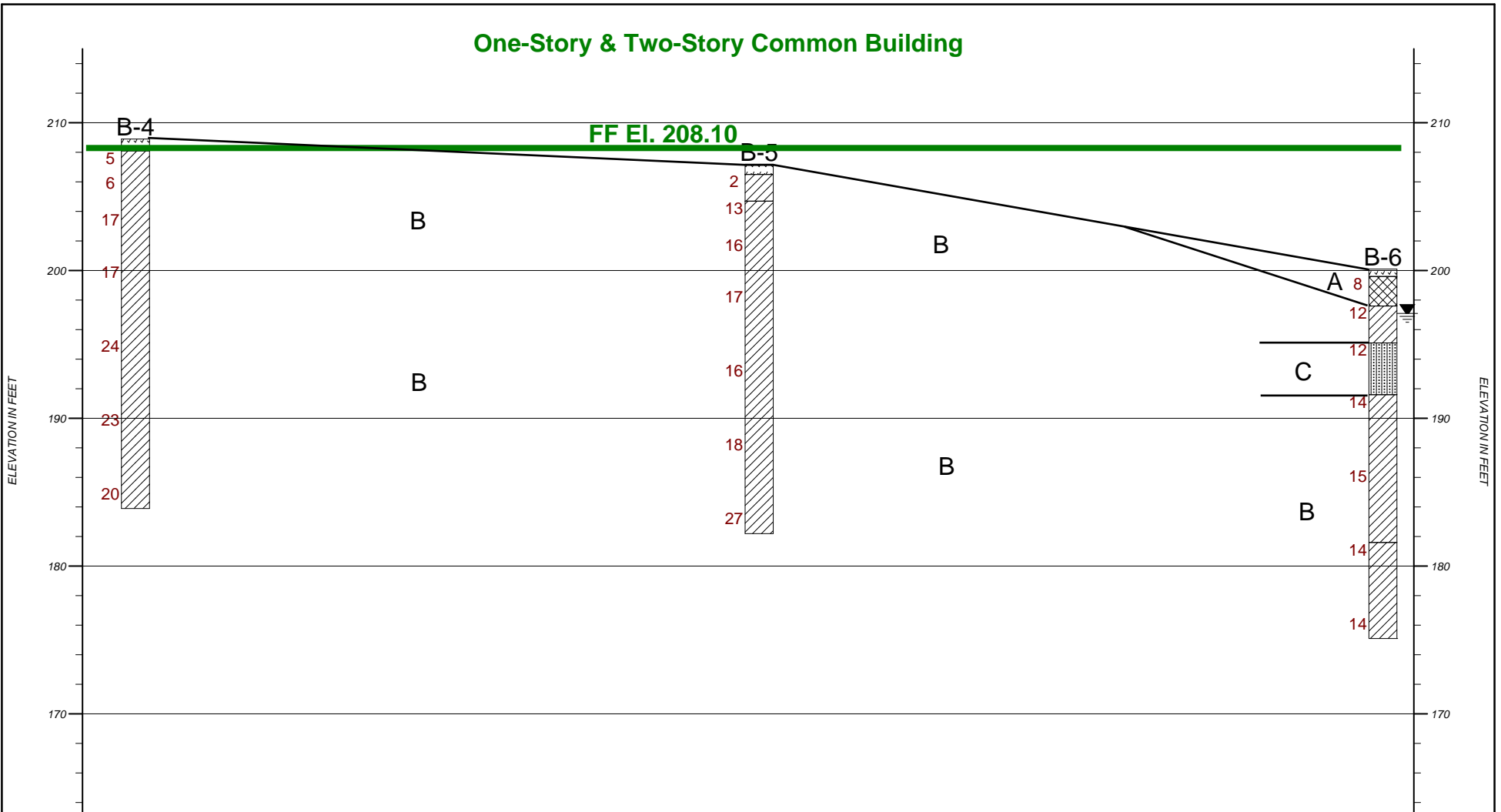


Strata symbols

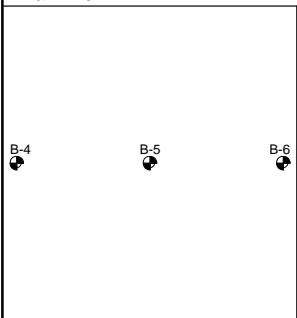
- Topsoil
- Low plasticity clay
- Fill

GEOTECH ENGINEERS, INC.		
GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: 1"=(proportional)'	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=10'	AB	12/16/2018
Glenridge MS		
PROJECT NO. 382474		Profile A-A





One-Story & Two-Story Common Building



Plan View

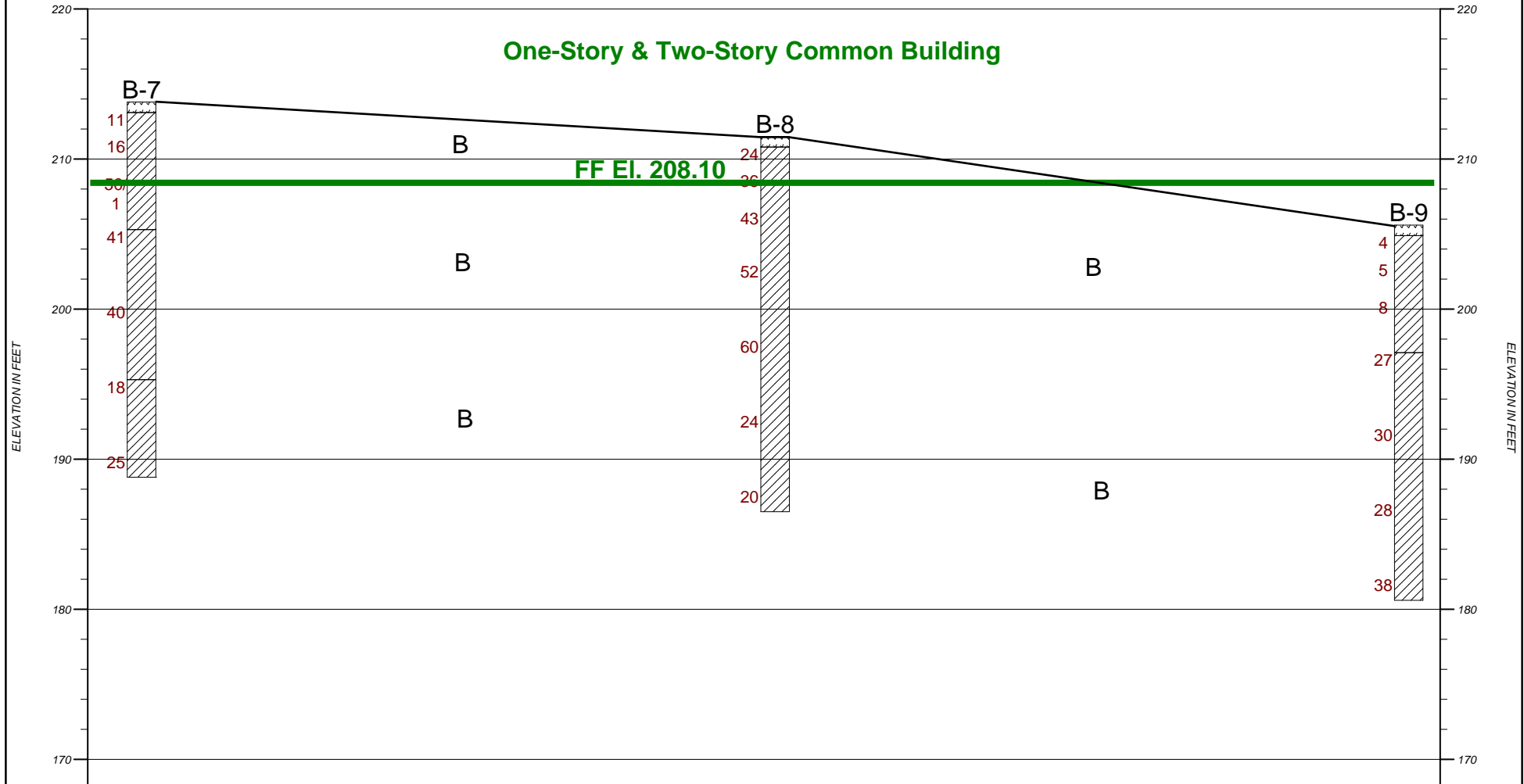


Strata symbols

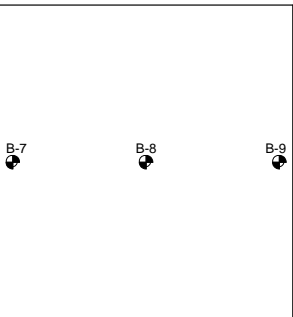
-  Topsoil
-  Low plasticity clay
-  Fill
-  Silty sand

GEOTECH ENGINEERS, INC.		
GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: 1"=(proportional) VERTICAL SCALE: 1"=10'	DRAWN BY/APPROVED BY AB	DATE DRAWN 12/16/2018
Glenridge MS		
PROJECT NO. 382474		Profile B-B



One-Story & Two-Story Common Building



Plan View

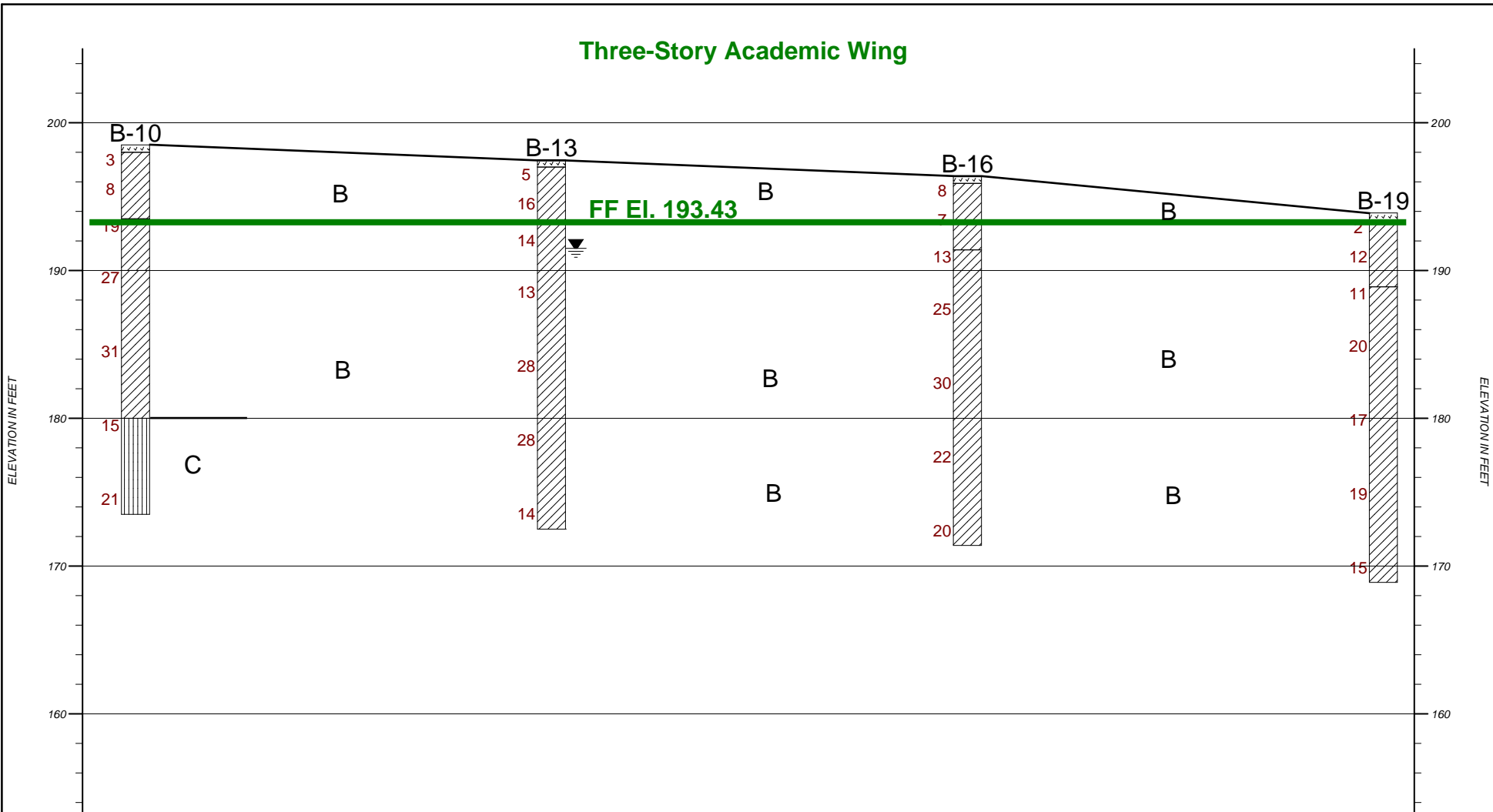


Strata symbols

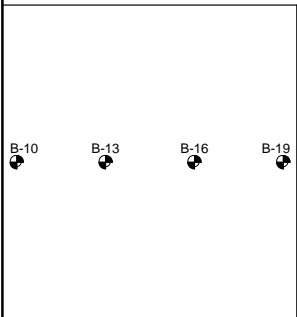
-  Topsoil
-  Low plasticity clay

GEOTECH ENGINEERS, INC.		
GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: 1"=(proportional)	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=10'	AB	12/16/2018
Glenridge MS		
PROJECT NO. 382474		Profile C-C




Three-Story Academic Wing



Plan View

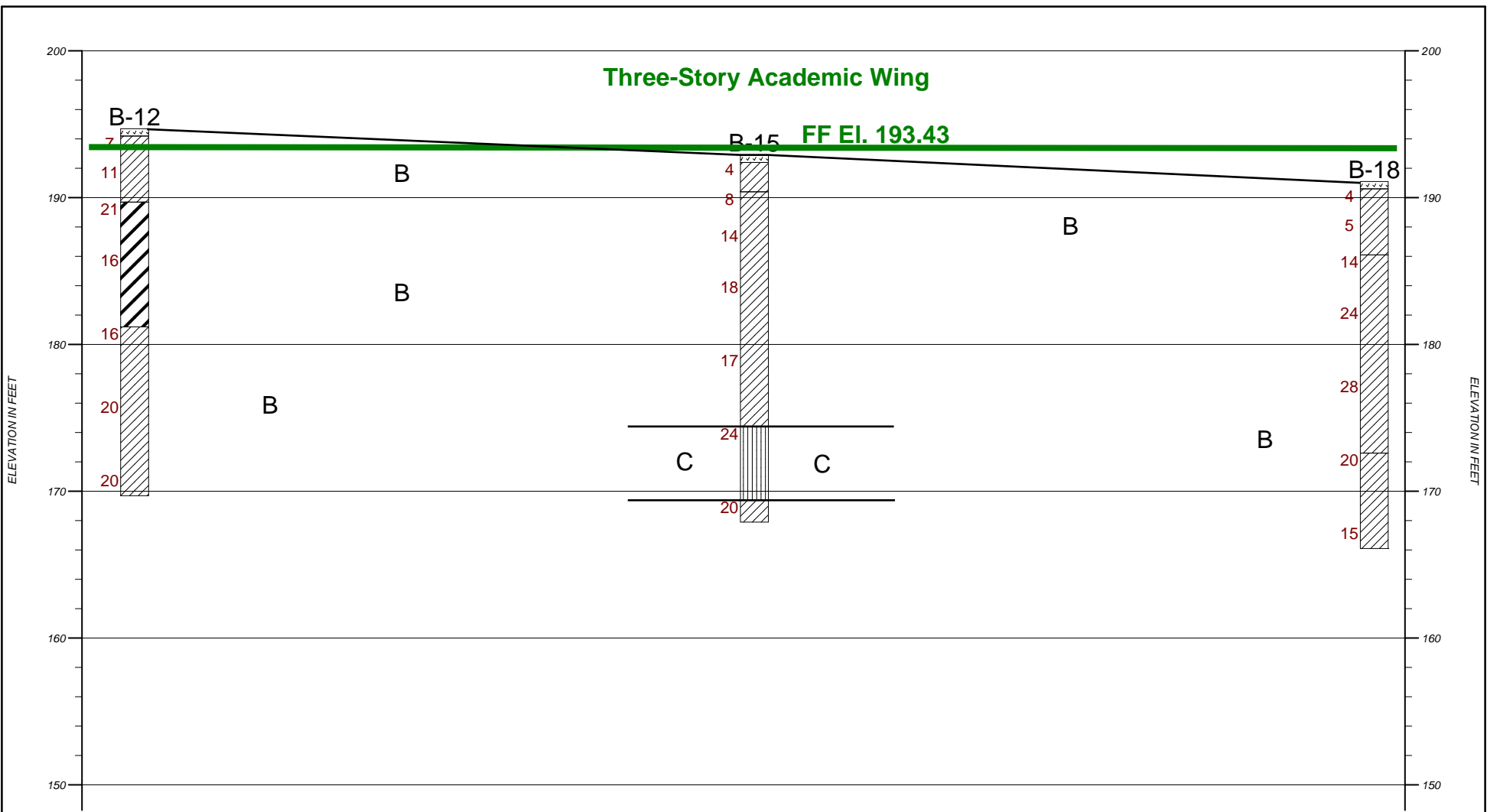


Strata symbols

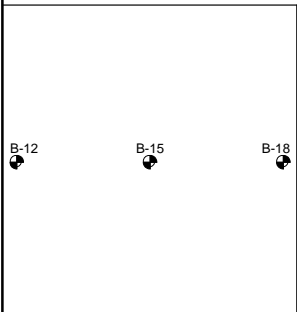
-  Topsoil
-  Low plasticity clay
-  Silt

GEOTECH ENGINEERS, INC.		
GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: 1"=(proportional)'	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=10'	AB	12/16/2018
Glenridge MS		
PROJECT NO. 382474		Profile D-D

Three-Story Academic Wing



Plan View

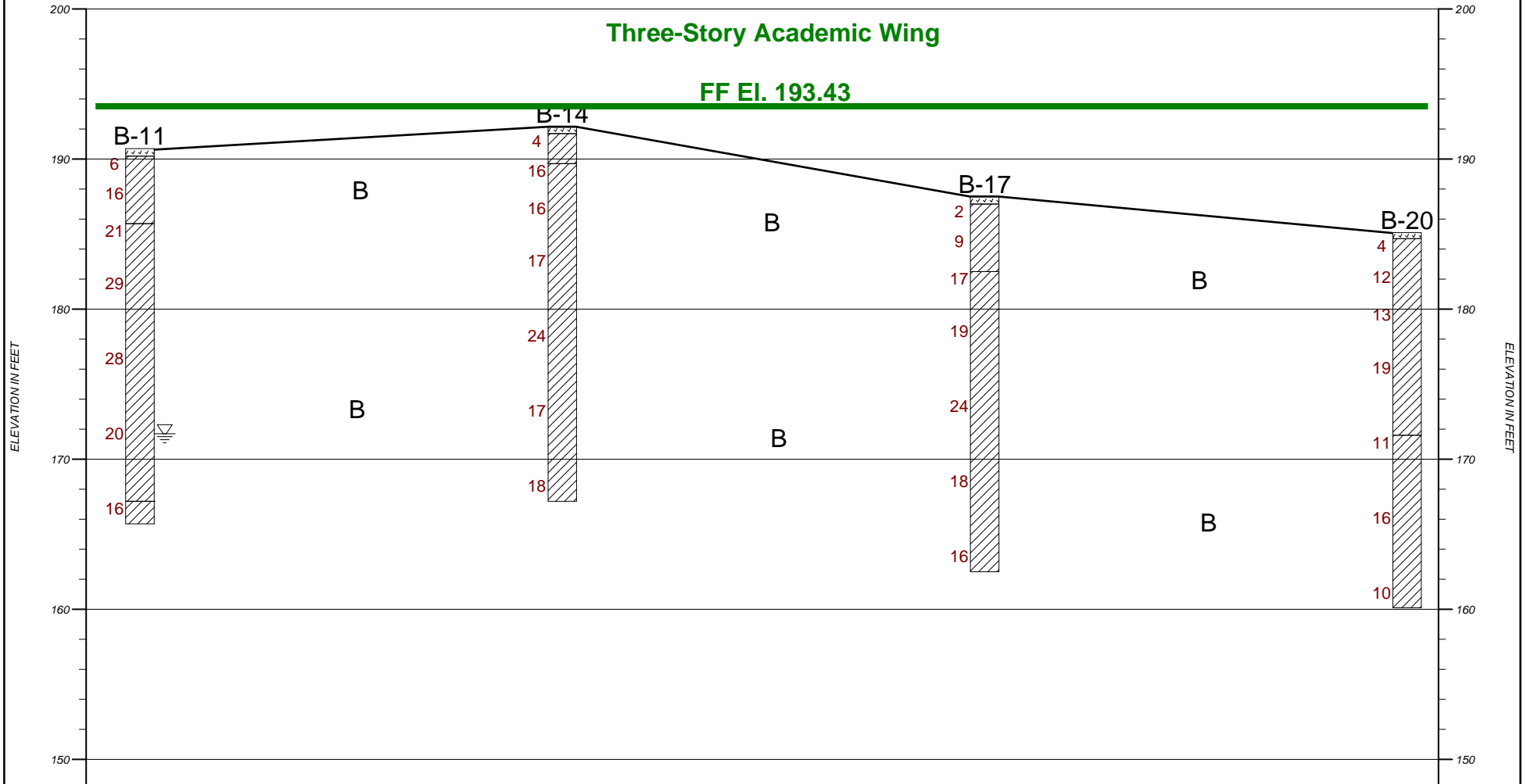


- Strata symbols**
- Topsoil
 - Low plasticity clay
 - High plasticity clay
 - Silt

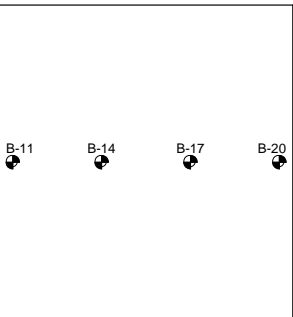
GEOTECH ENGINEERS, INC.		
GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: 1"=(proportional)	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=10'	AB	12/16/2018
Glenridge MS		
PROJECT NO. 382474		Profile E-E

Three-Story Academic Wing



FF El. 193.43



Plan View



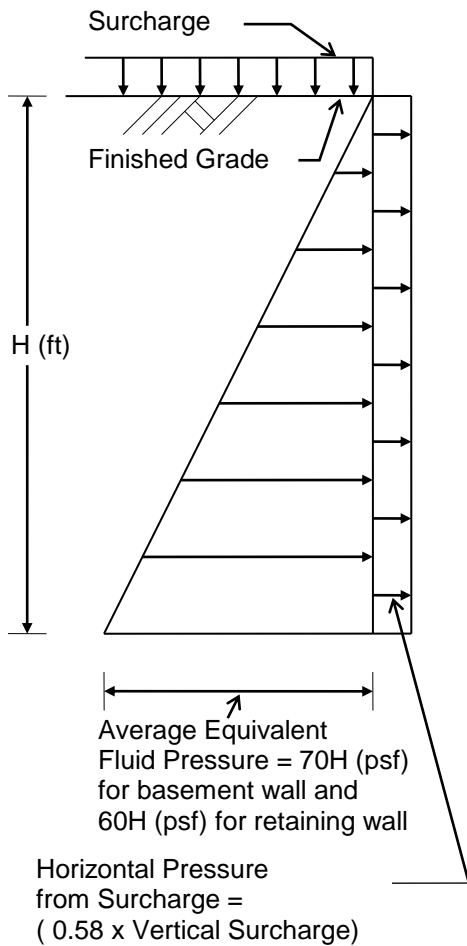
Strata symbols

-  Topsoil
-  Low plasticity clay

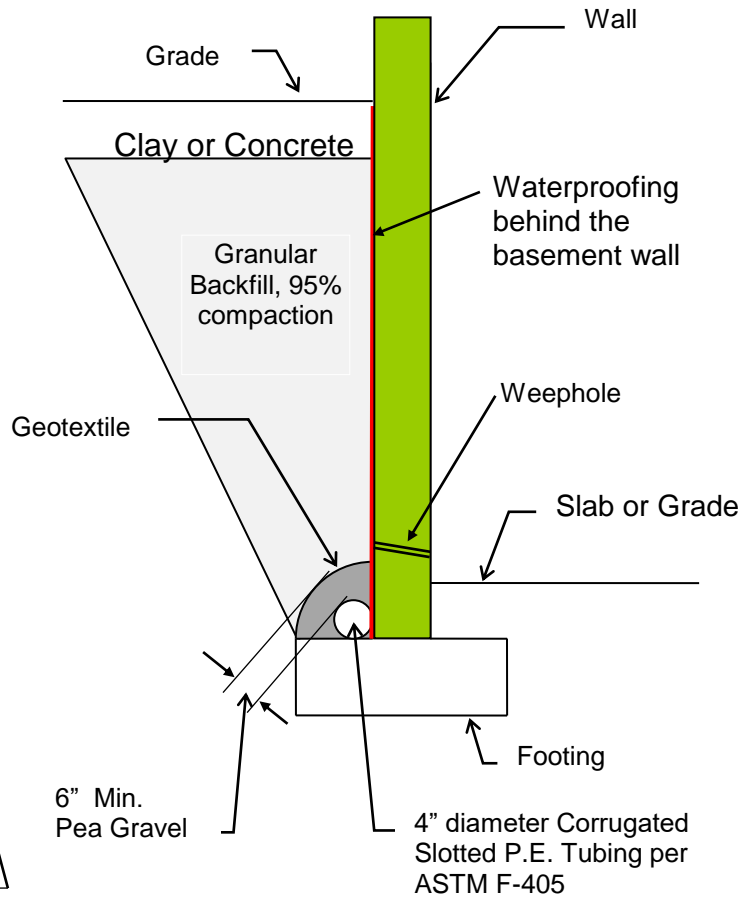
GEOTECH ENGINEERS, INC.		
GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: 1"=(proportional)	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=10'	AB	12/16/2018
Glenridge MS		
PROJECT NO. 382474		Profile F-F

APPENDIX F

Lateral Earth Pressure Diagrams



LATERAL PRESSURE DIAGRAM
NTS



TYPICAL SECTION OF FOOTING DRAIN
NTS

PROJECT NAME:
Glenridge MS
5211 Flintridge Drive,
Hyattsville, MD

TITLE:
Lateral Earth Pressure
Diagram

PROJECT NO:
382474

APPENDIX G

Test Boring Report

Test Boring Logs, Boring Nos. B-1 to B-25 and I-1 to I-9
Boring Location Plan

TEST BORING REPORT

1. Test Borings

The test borings were drilled by a hollow stem auger. The standard penetration tests (SPT's) were performed at the depths shown on the boring logs. The auger was advanced to the desired depth and standard penetration test was performed after plug was removed. An automatic hammer was used for SPT's.

2. Boring Survey

Boring stakeout were provided by Grimm and Parker Architects. Elevations were obtained from the site plan provided to us.

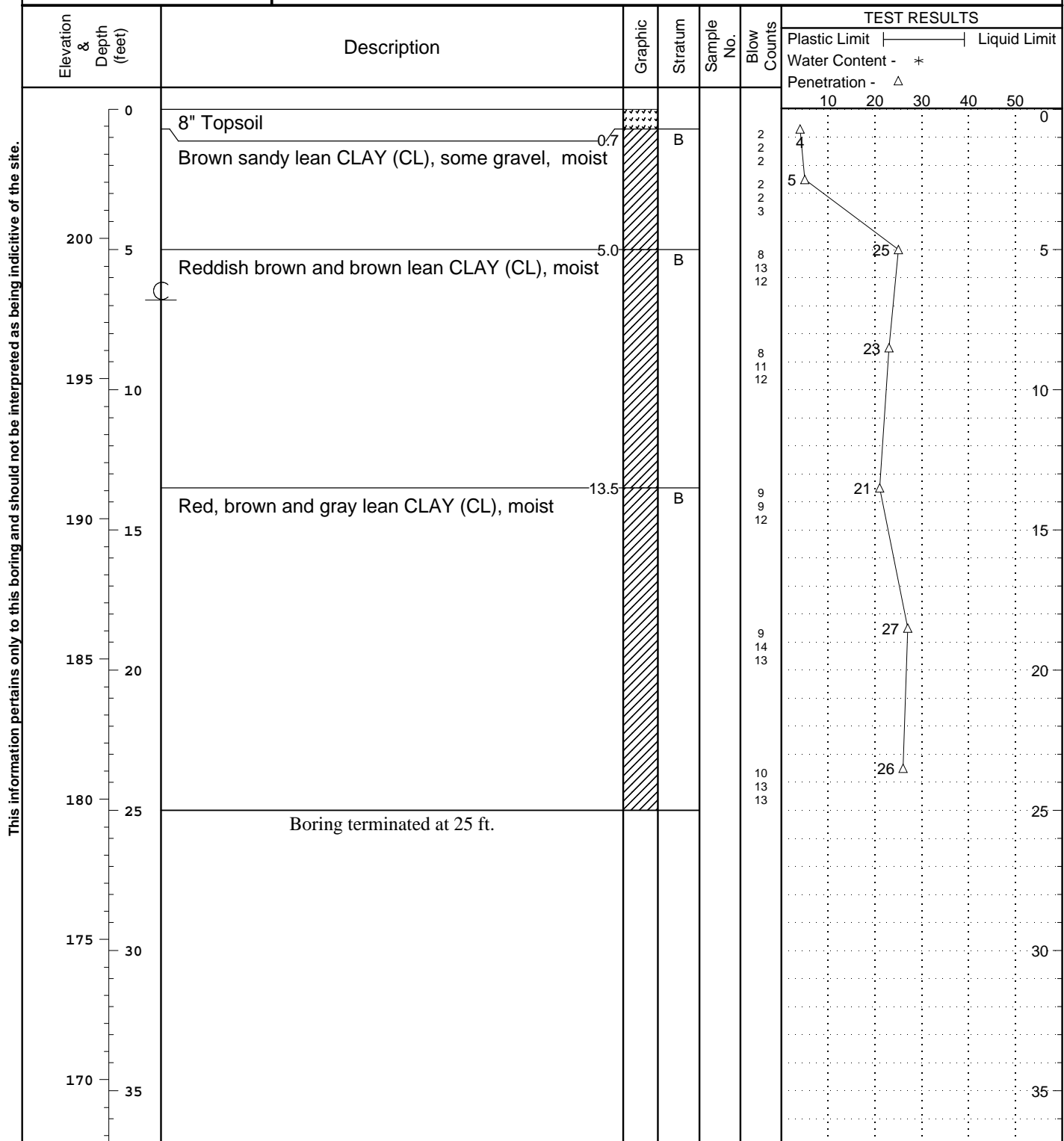
3. General Notes

- a. Numbers in "blow count" column indicate blows required to drive a 2 inch O.D., 1-3/8 inch I.D. sampling spoon through 6 inch intervals or as indicated, using a 140 lb hammer falling 30 inches, according to ASTM D-1586.
- b. Groundwater levels shown on the logs are estimated from the available data and may vary with precipitation, porosity of the soil, site topography, etc.
- c. The boring logs and related information depict subsurface conditions only at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations.
- d. The stratification lines represent the approximate boundary between soil and rock types as determined from the drilling and sampling operation. Some variation may also be expected vertically between samples taken. The soil profile, water level observations and penetration resistance presented on these boring logs have been made with reasonable care and accuracy, and must be considered only an approximate representation of subsurface conditions to be encountered at the particular location.
- e. Soil samples were classified according to ASTM D-2487.
- f. WOH: Weight of hammer
GS: Ground Surface

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-1

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 204.6
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 6.8 ft

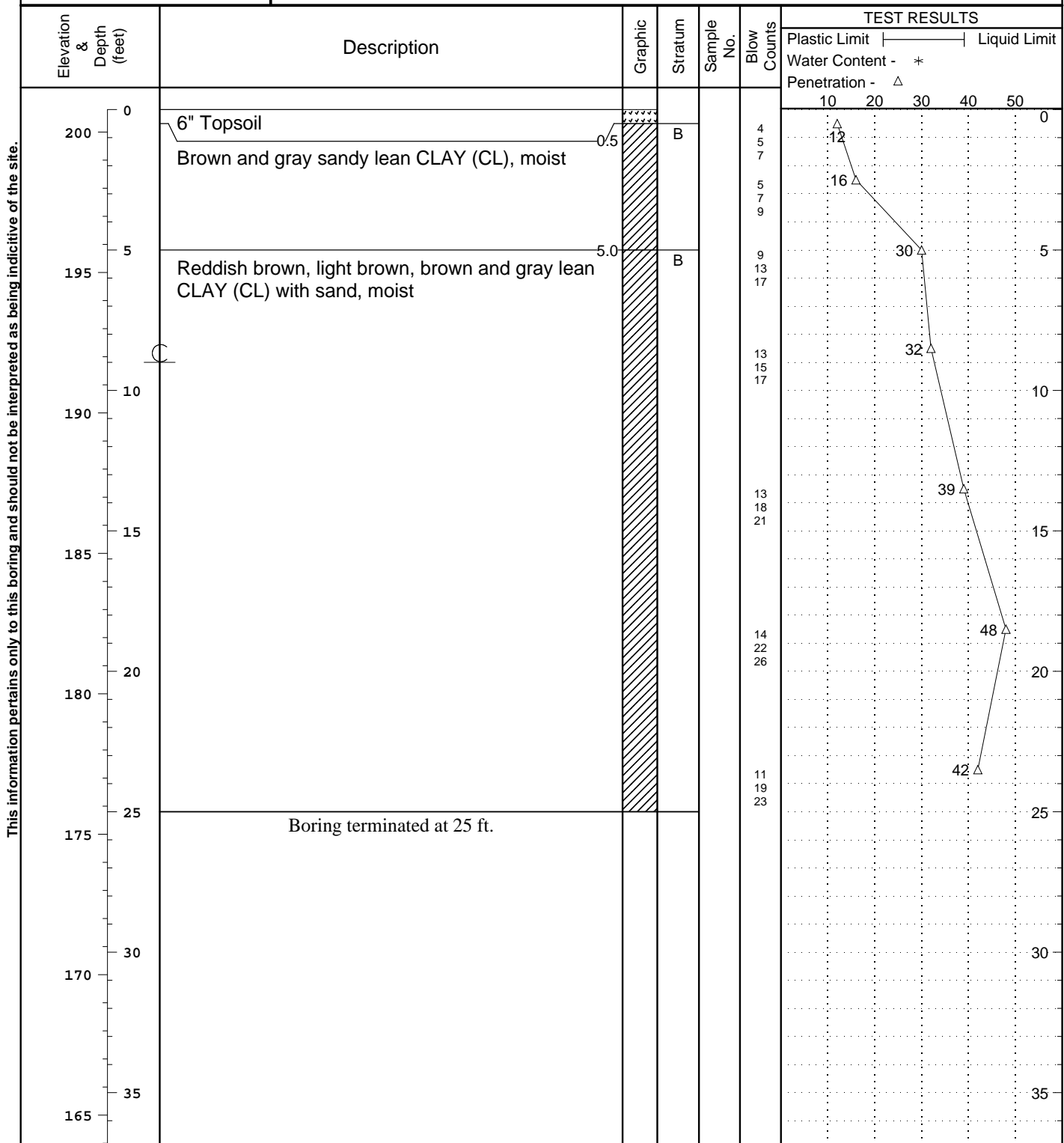


Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-2

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 200.8
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 9.0 ft



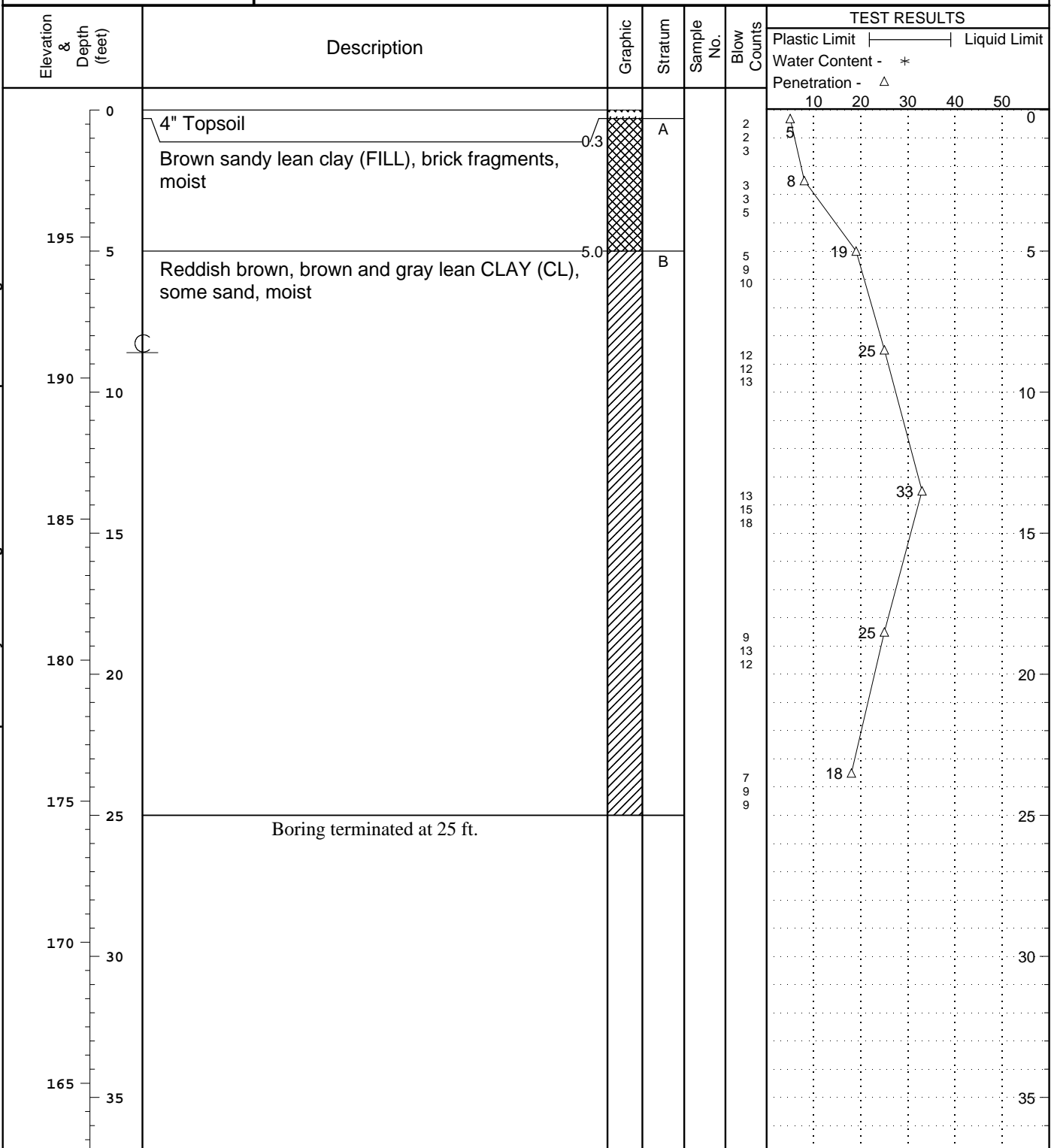
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-3

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 199.5
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 8.6 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



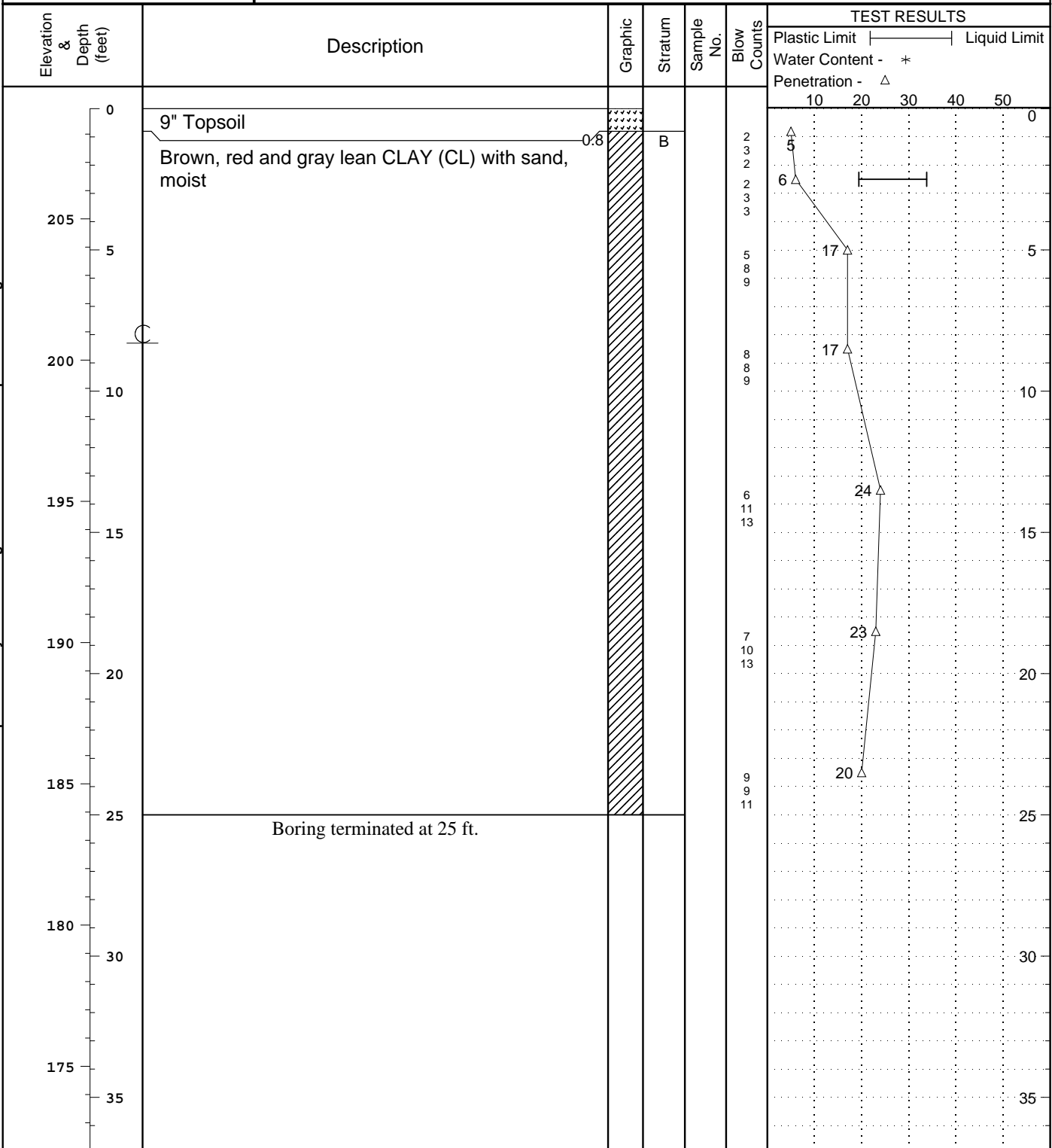
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-4

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 208.9
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 8.3 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



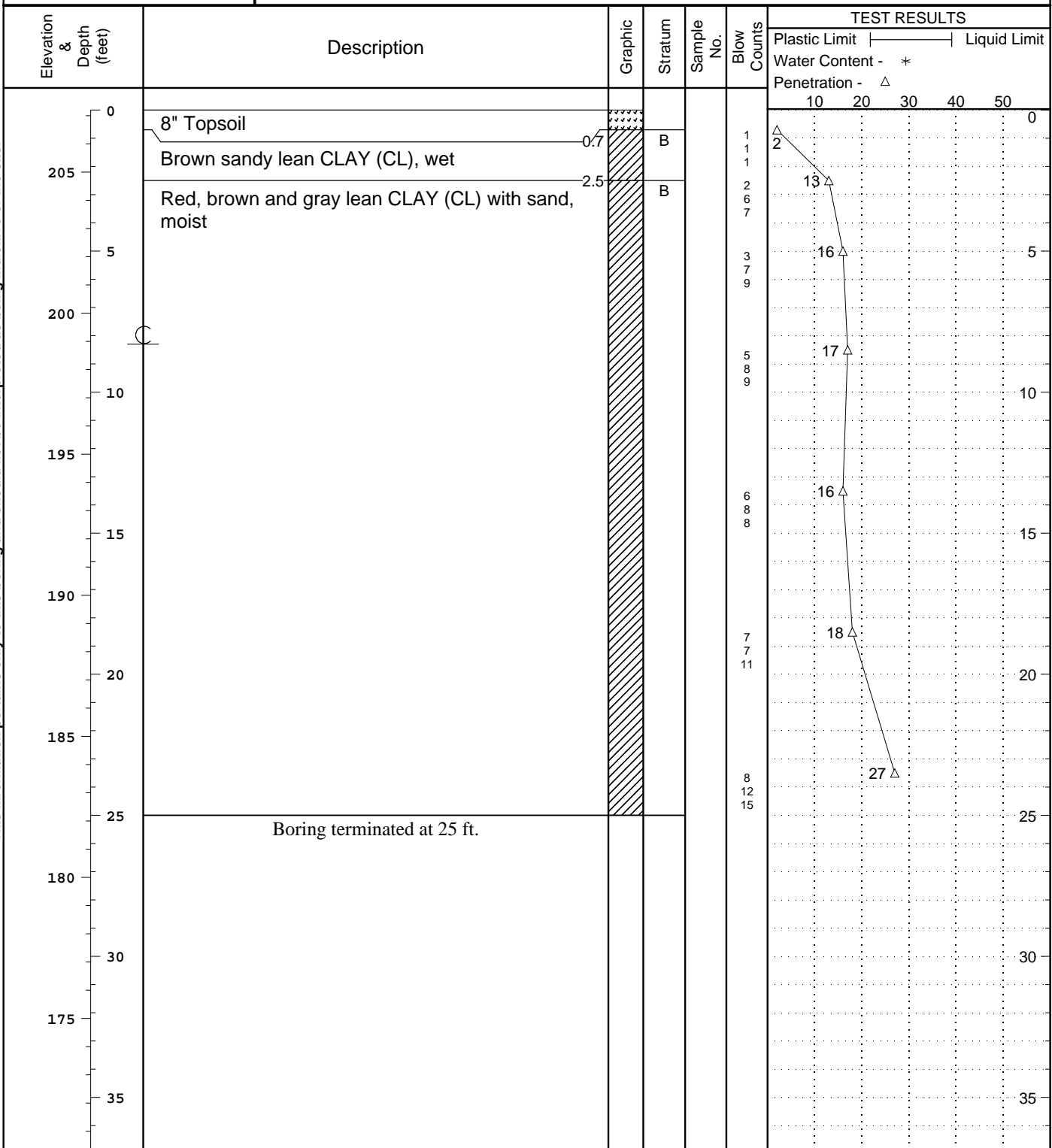
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-5

PROJECT: Glenridge MS **PROJECT NO.:** 382474
CLIENT: Grimm and Parker
PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
LOCATION: See plan **ELEVATION:** 207.2
DRILLER: Connelly and Associates, Inc **LOGGED BY:** AB
DRILLING METHOD: Hollow Stem Auger **DATE:** 11-27-18
DEPTH TO - WATER> INITIAL: None **AFTER 24 HOURS:** Dry **CAVING>** C 8.3 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



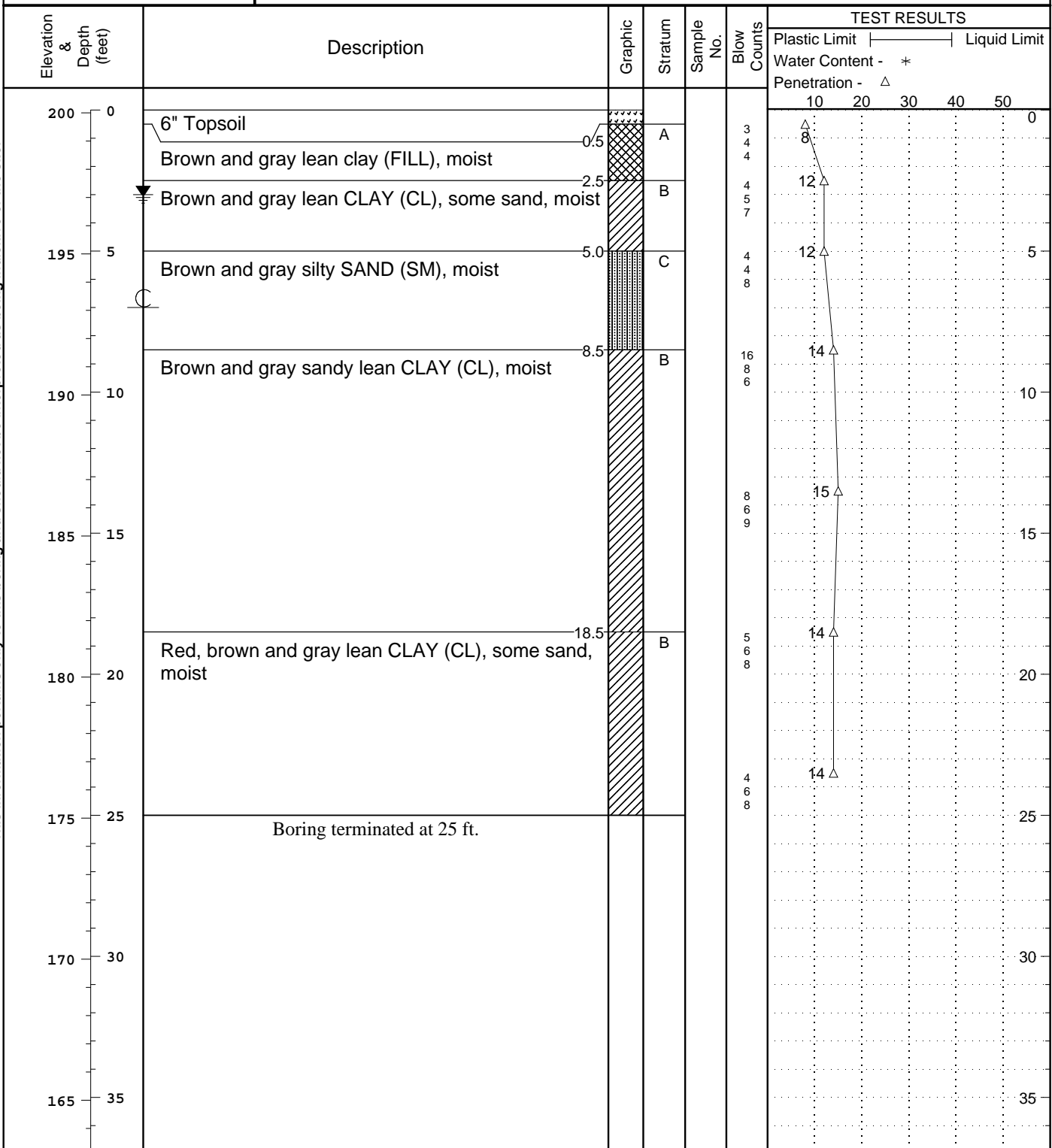
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-6

PROJECT: Glenridge MS **PROJECT NO.:** 382474
CLIENT: Grimm and Parker
PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
LOCATION: See plan **ELEVATION:** 200.1
DRILLER: Connelly and Associates, Inc **LOGGED BY:** AB
DRILLING METHOD: Hollow Stem Auger **DATE:** 11-28-18
DEPTH TO - WATER > INITIAL: ∇ None **AFTER 24 HOURS:** ∇ 3 ft **CAVING >** C 7.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



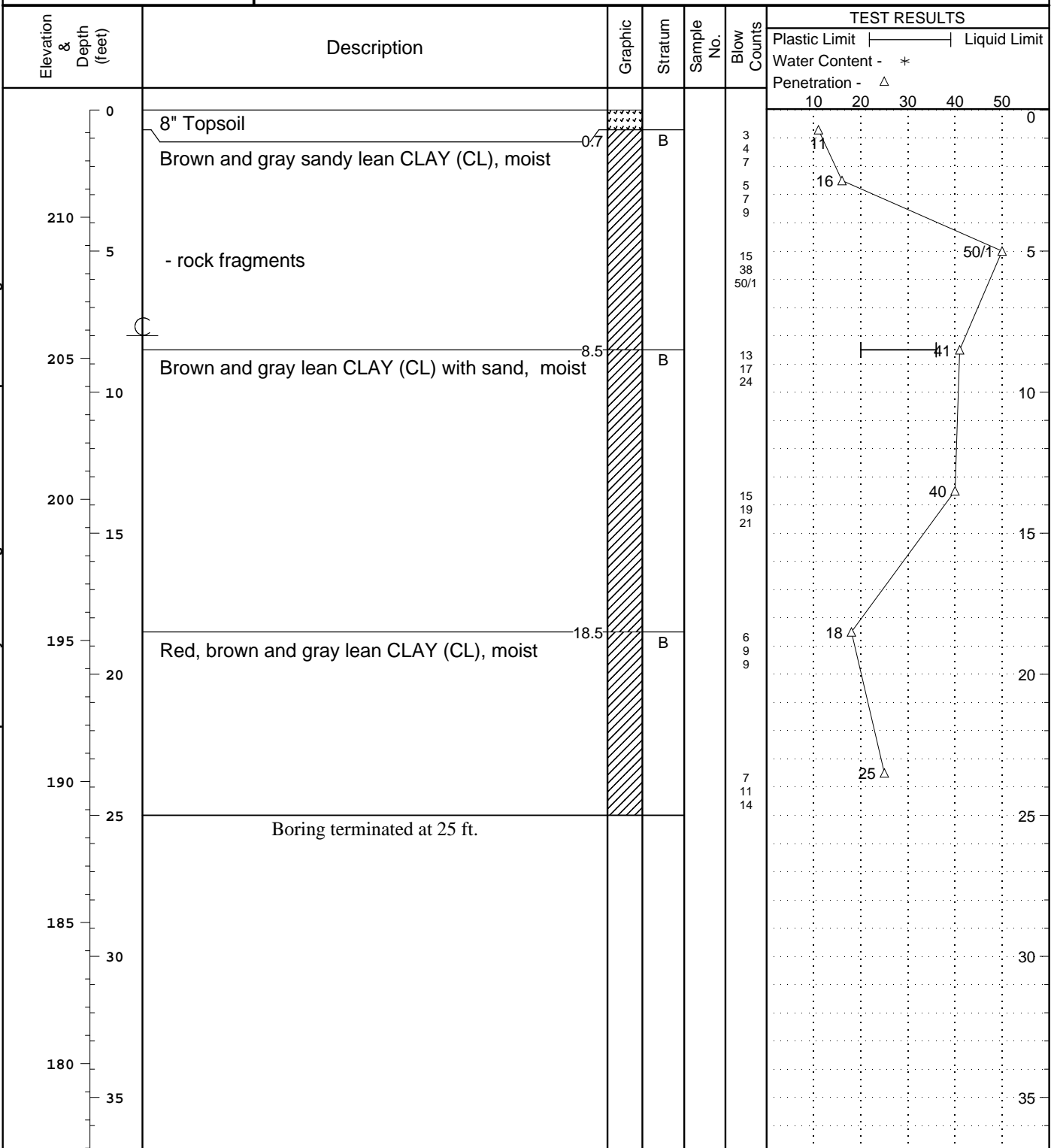
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-7

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 213.8
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 8.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



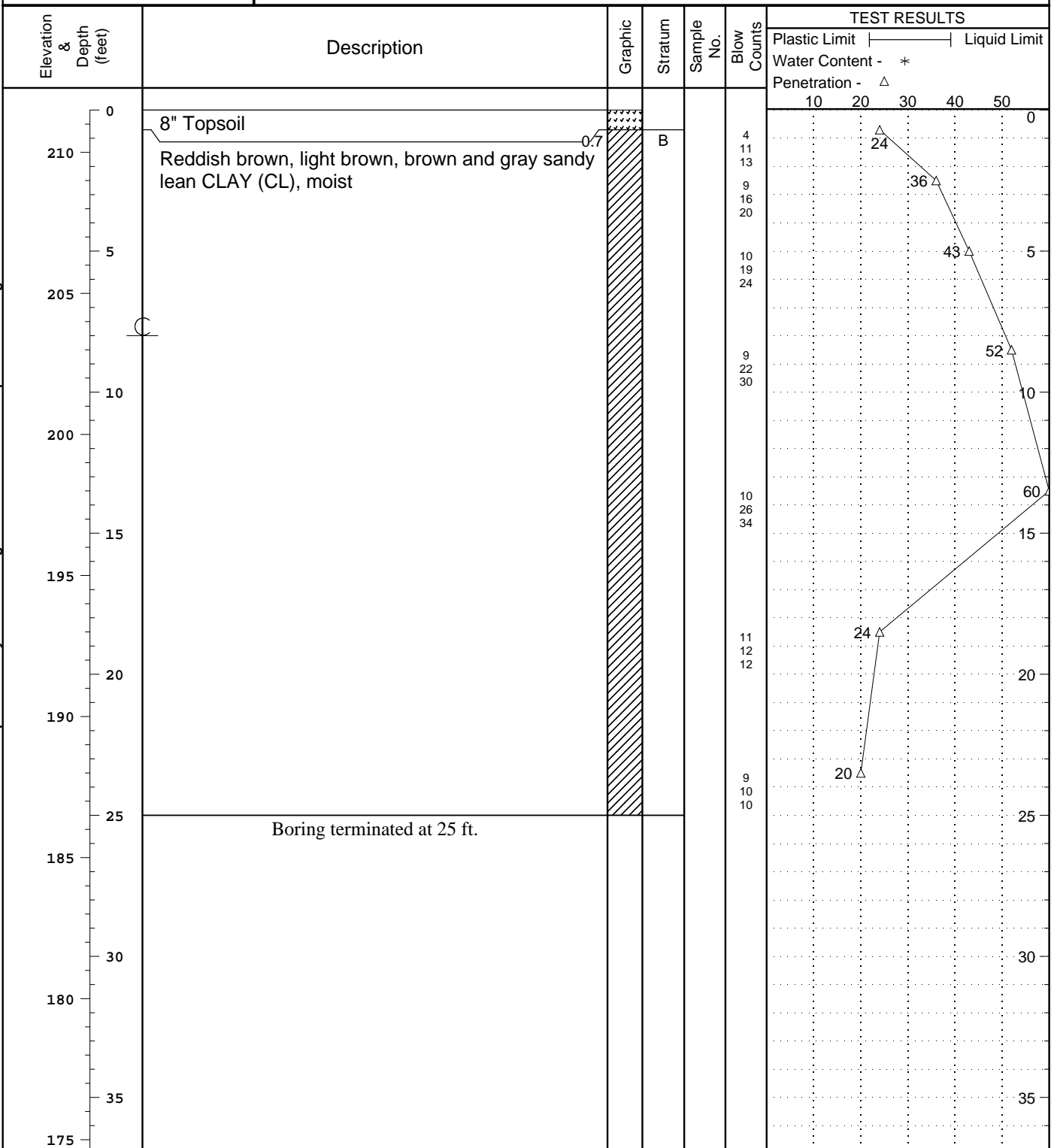
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-8

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 211.5
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 8.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



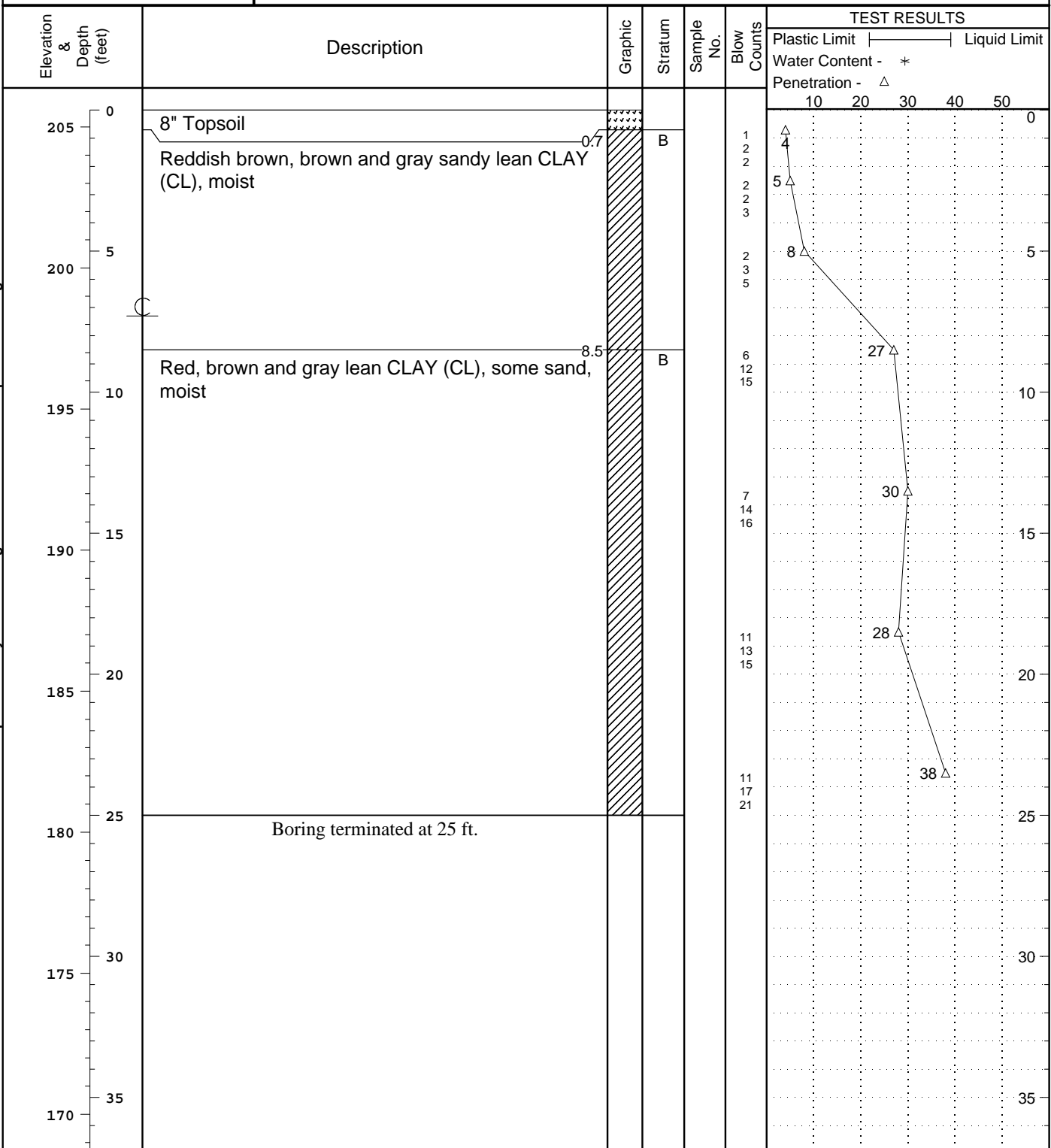
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-9

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 205.6
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 7.3 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



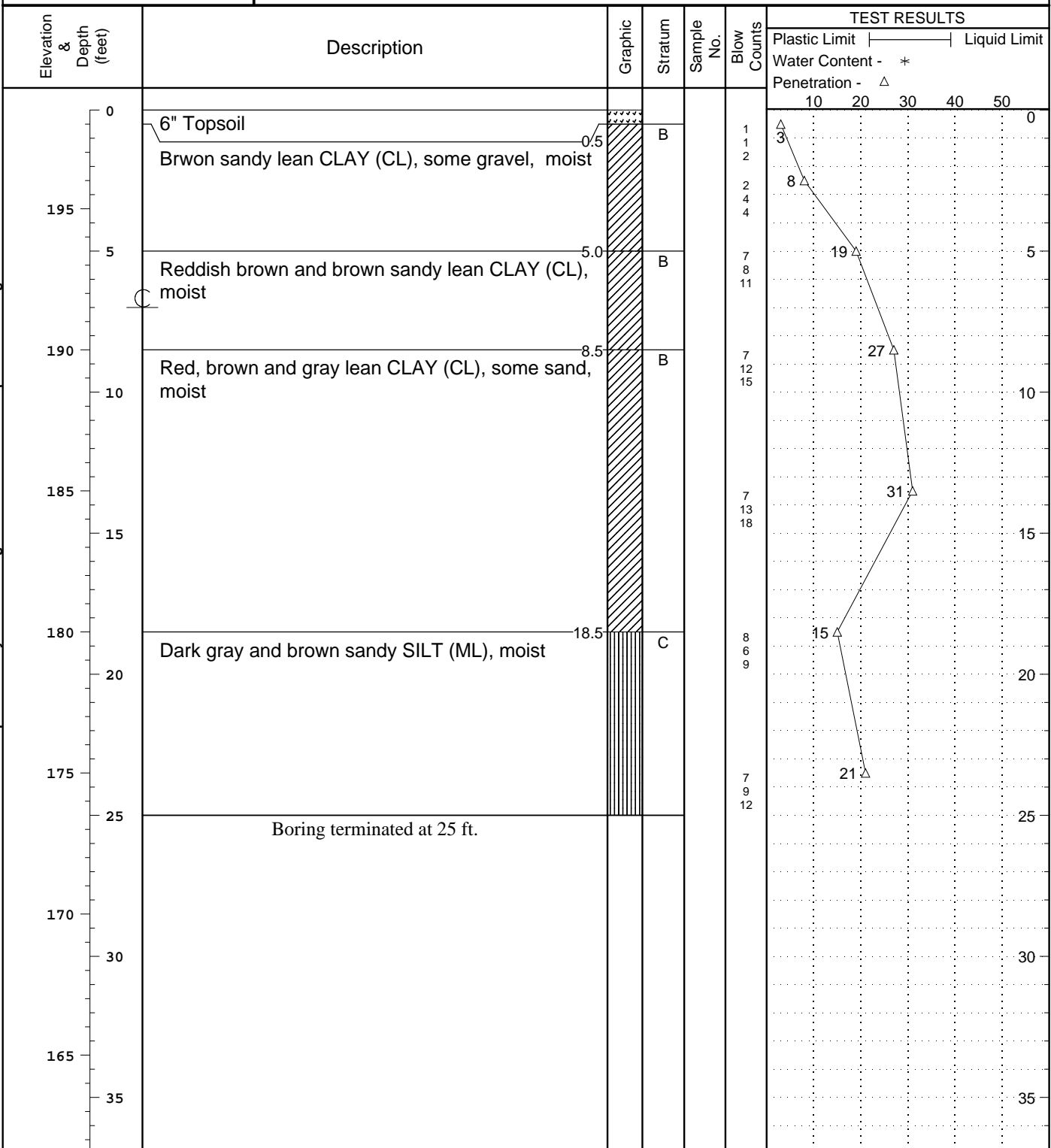
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-10

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 198.5
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 7.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.

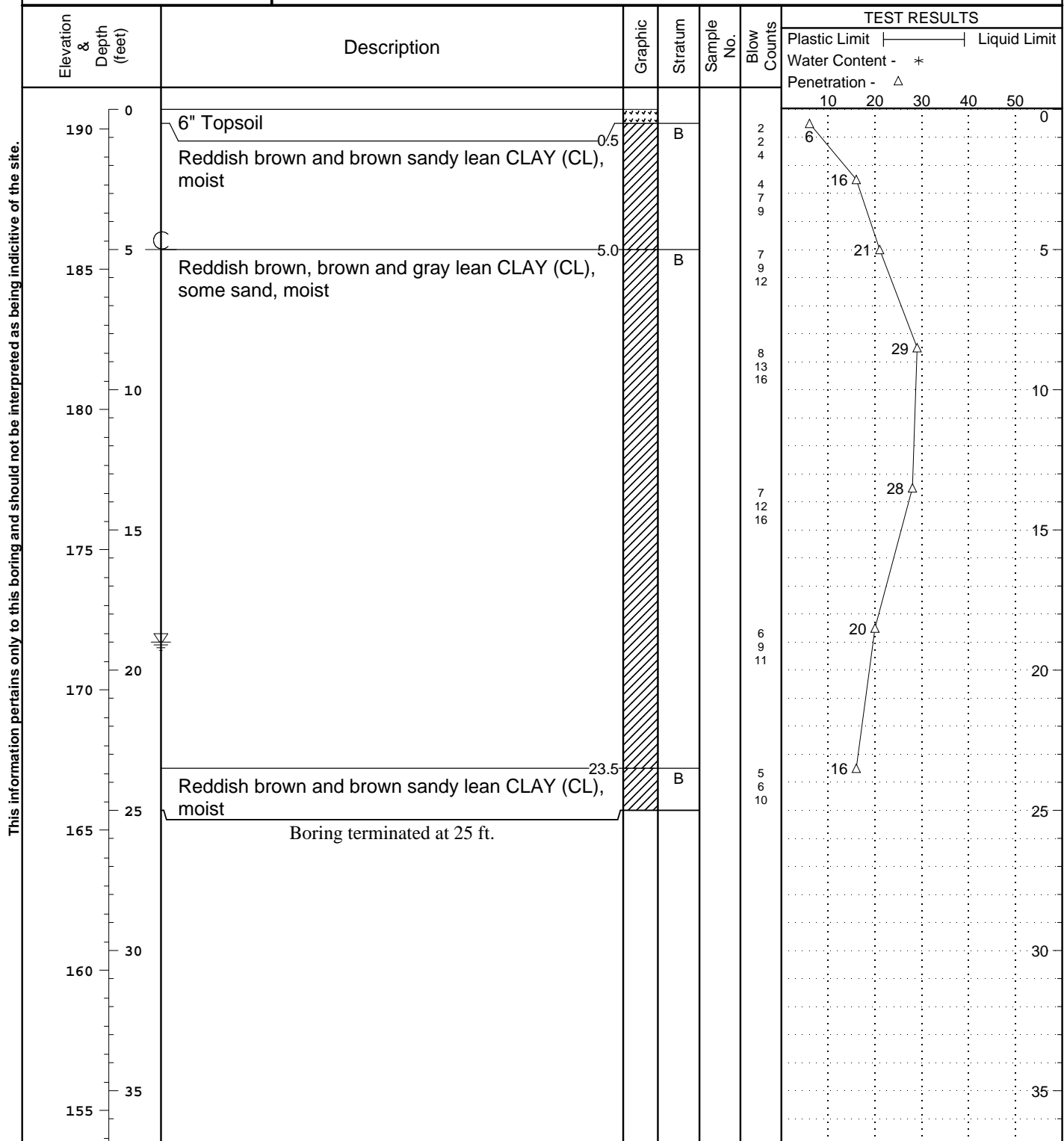


Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-11

PROJECT: Glenridge MS **PROJECT NO.:** 382474
CLIENT: Grimm and Parker
PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
LOCATION: See plan **ELEVATION:** 190.7
DRILLER: Connelly and Associates, Inc **LOGGED BY:** AB
DRILLING METHOD: Hollow Stem Auger **DATE:** 11-28-18
DEPTH TO - WATER> INITIAL: 19 ft **AFTER 24 HOURS:** Dry **CAVING>** C 5.0 ft



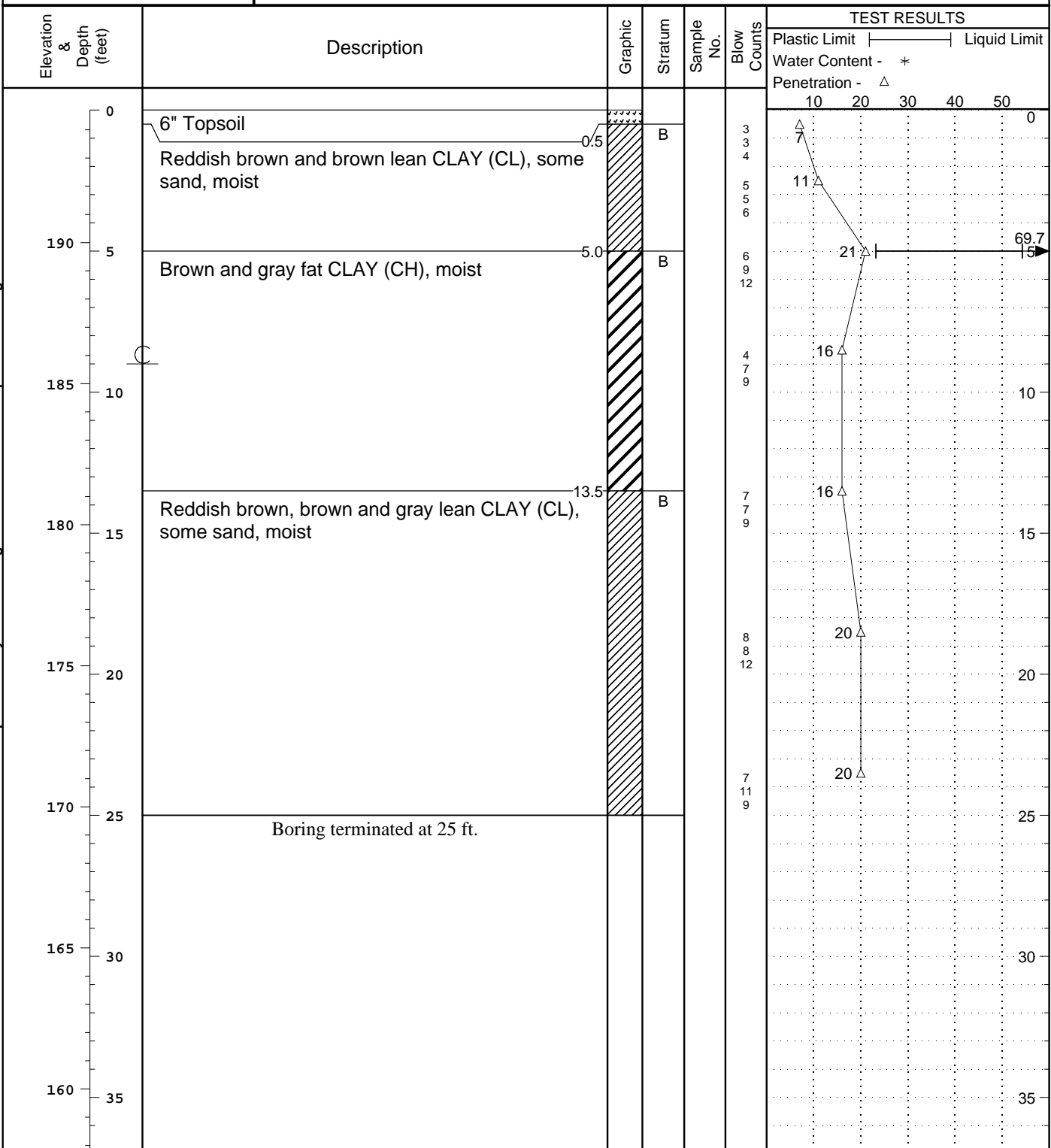
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-12

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 194.7
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 9.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



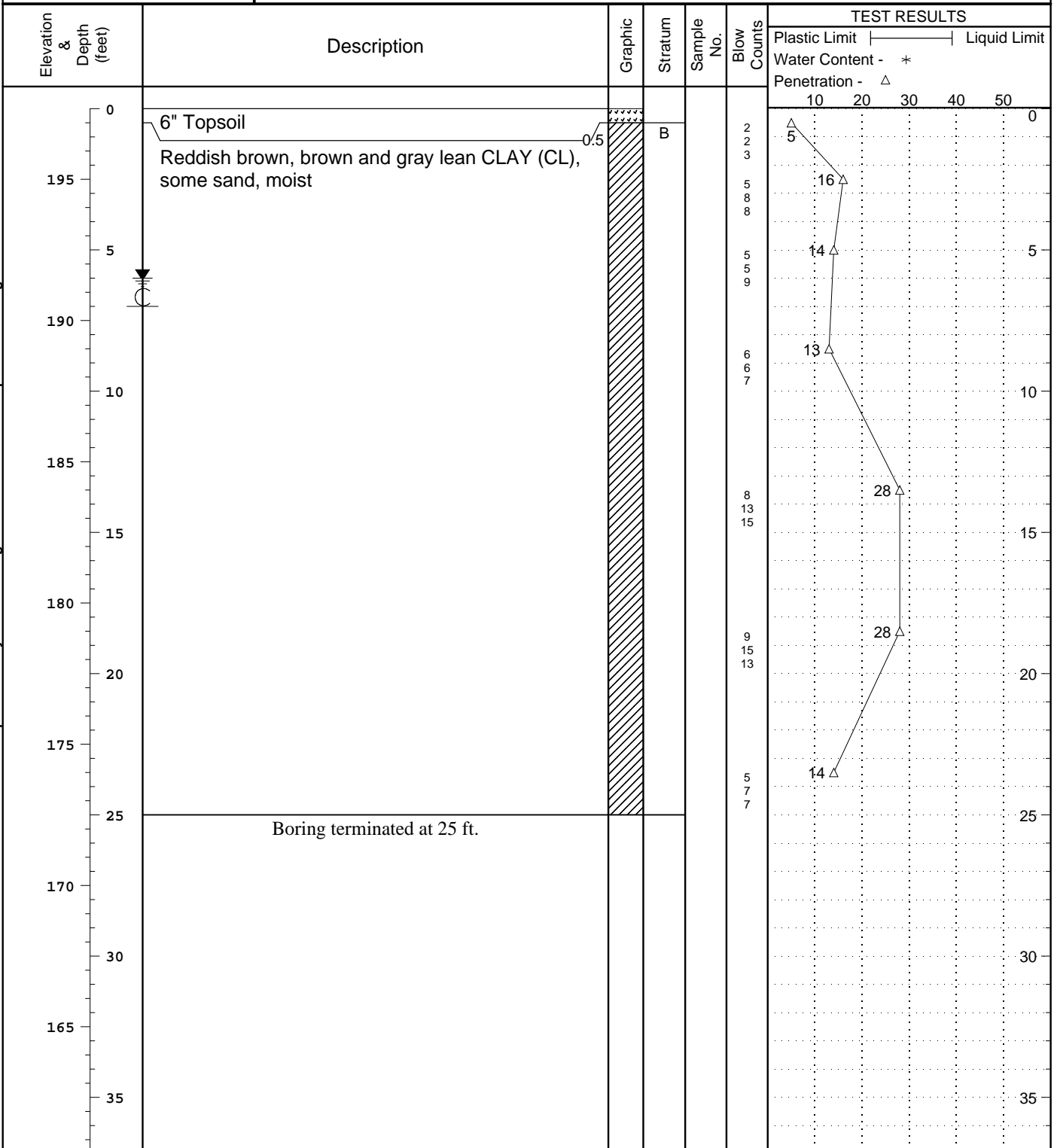
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-13

PROJECT: Glenridge MS **PROJECT NO.:** 382474
CLIENT: Grimm and Parker
PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
LOCATION: See plan **ELEVATION:** 197.5
DRILLER: Connelly and Associates, Inc **LOGGED BY:** AB
DRILLING METHOD: Hollow Stem Auger **DATE:** 11-28-18
DEPTH TO - WATER> INITIAL: None **AFTER 24 HOURS:** 6 ft **CAVING>** C 7.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



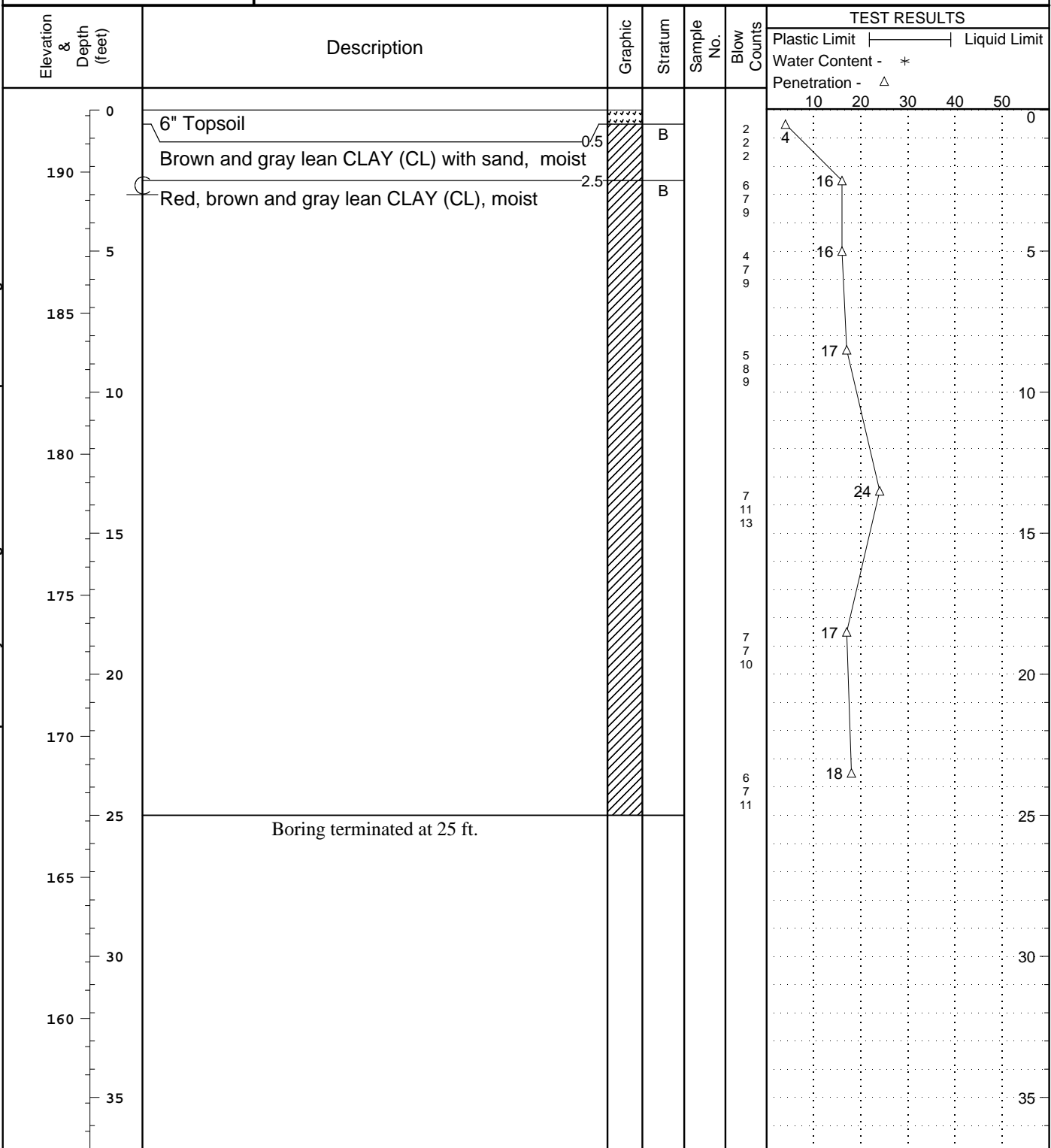
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-14

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 192.2
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 3.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



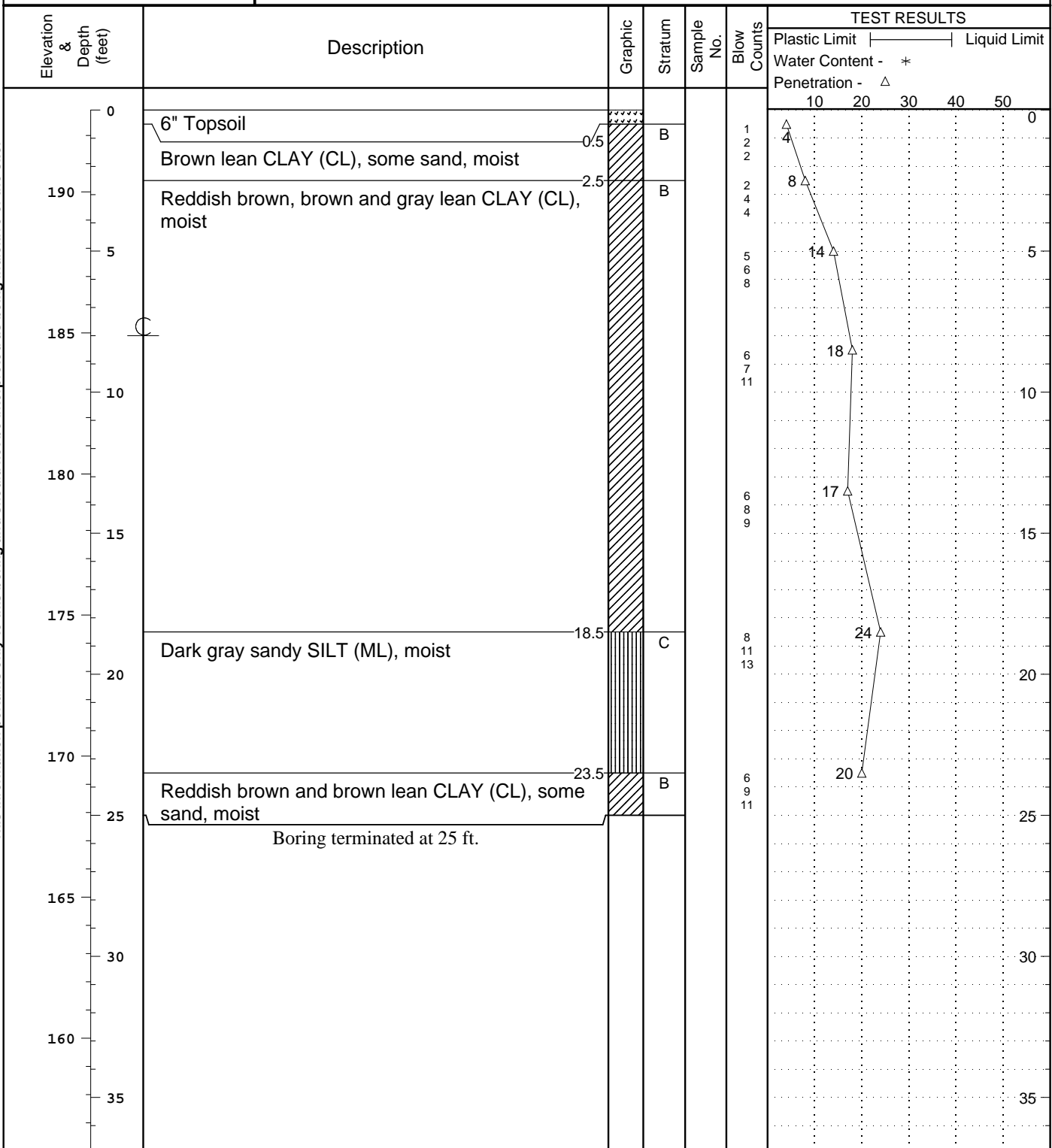
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-15

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 192.9
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 8.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



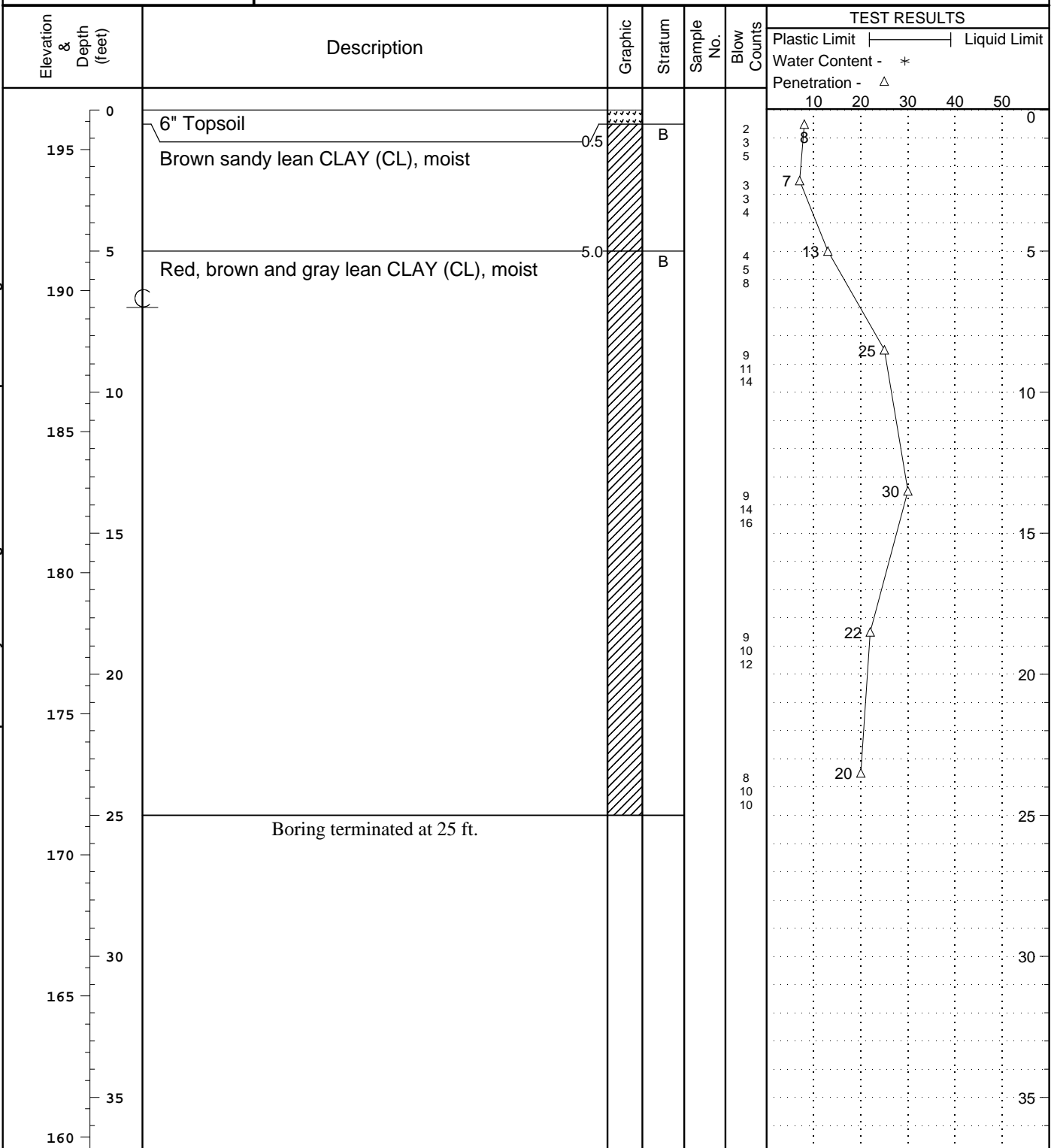
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-16

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 196.4
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: None DRY None CAVING> C 7.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



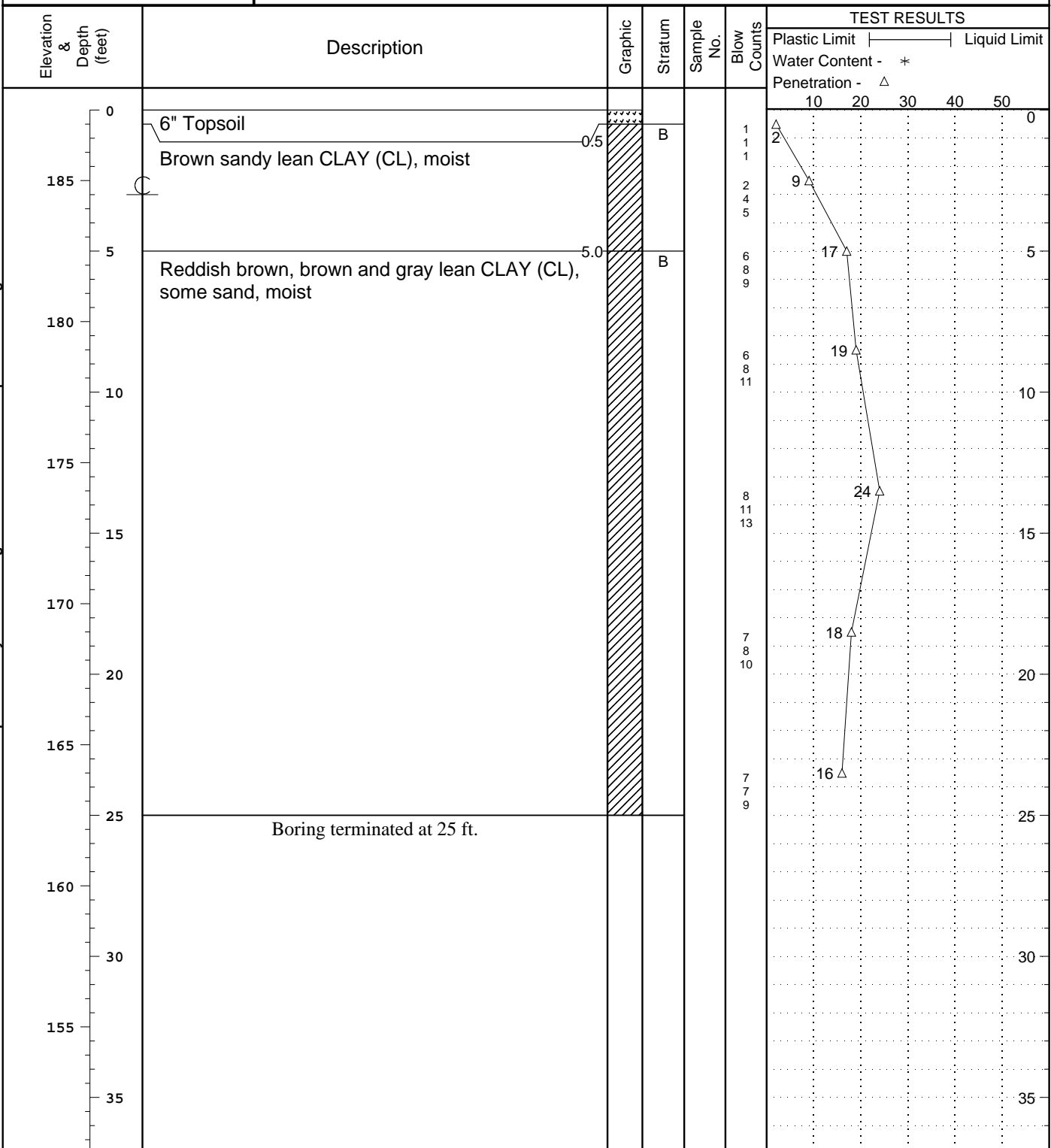
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-17

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 187.5
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: None DRY CAVING> C 3.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



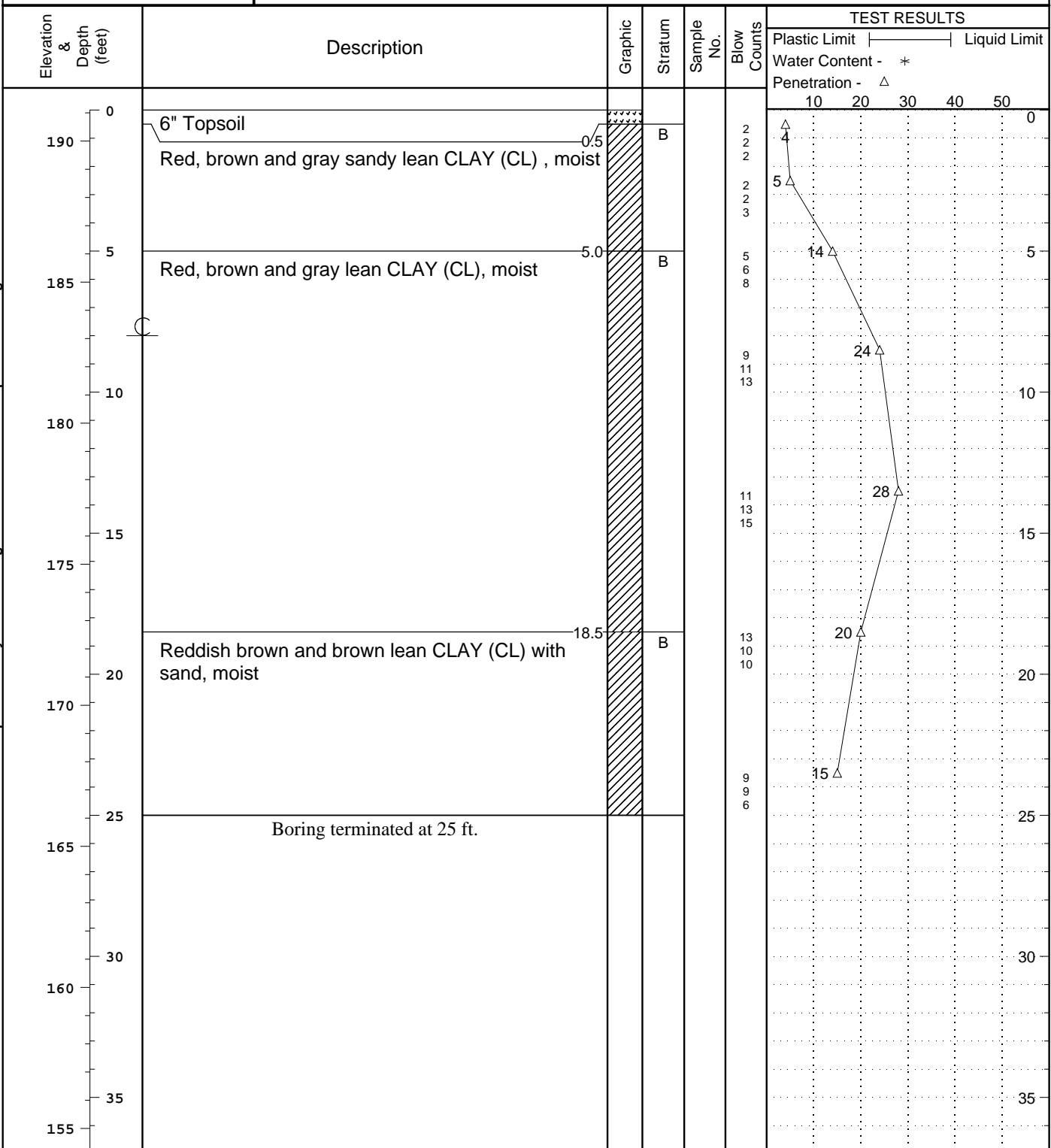
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-18

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 191.1
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 8.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



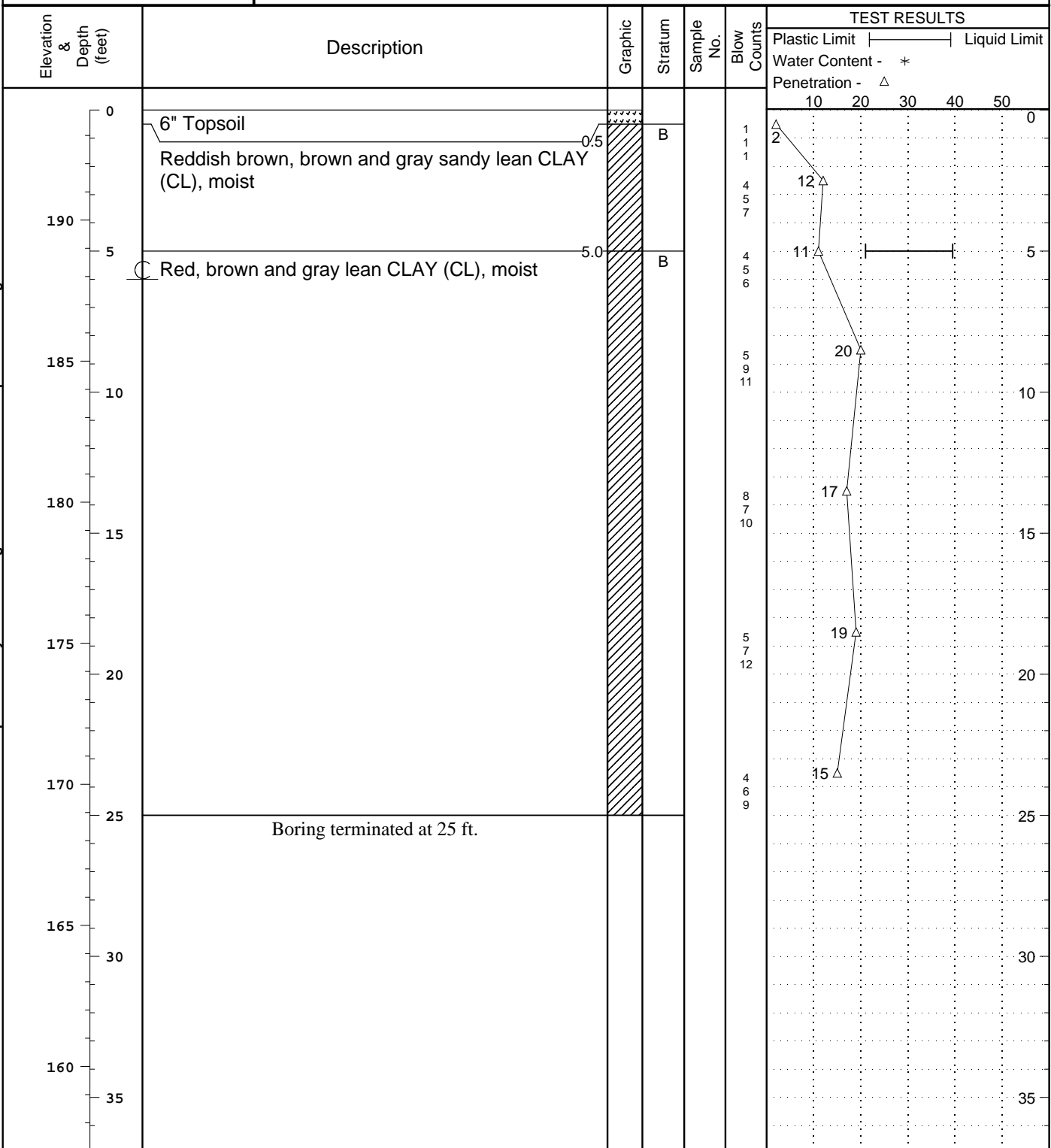
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-19

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 193.9
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-29-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 6.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



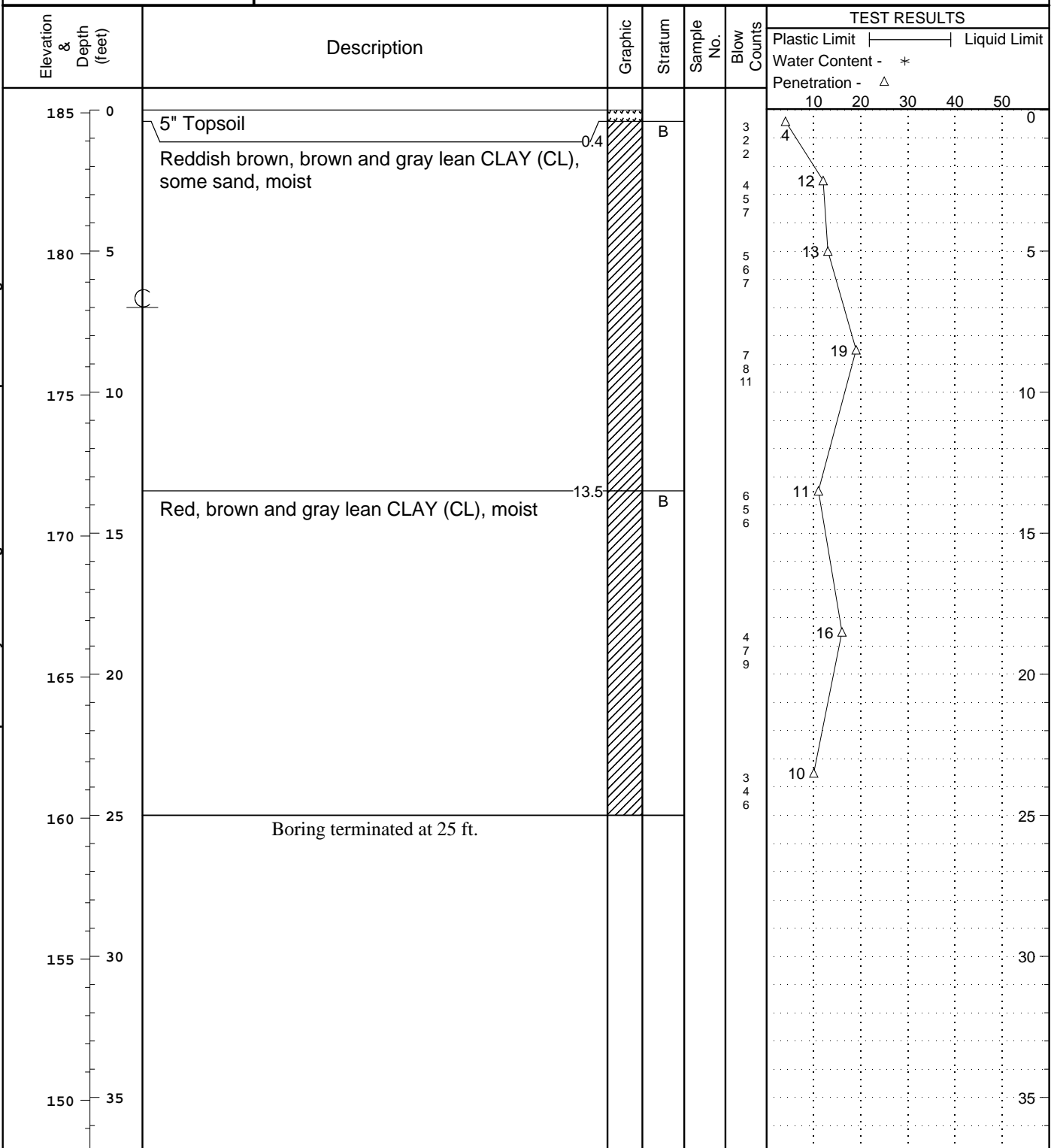
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-20

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 185.1
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-29-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 7.0 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



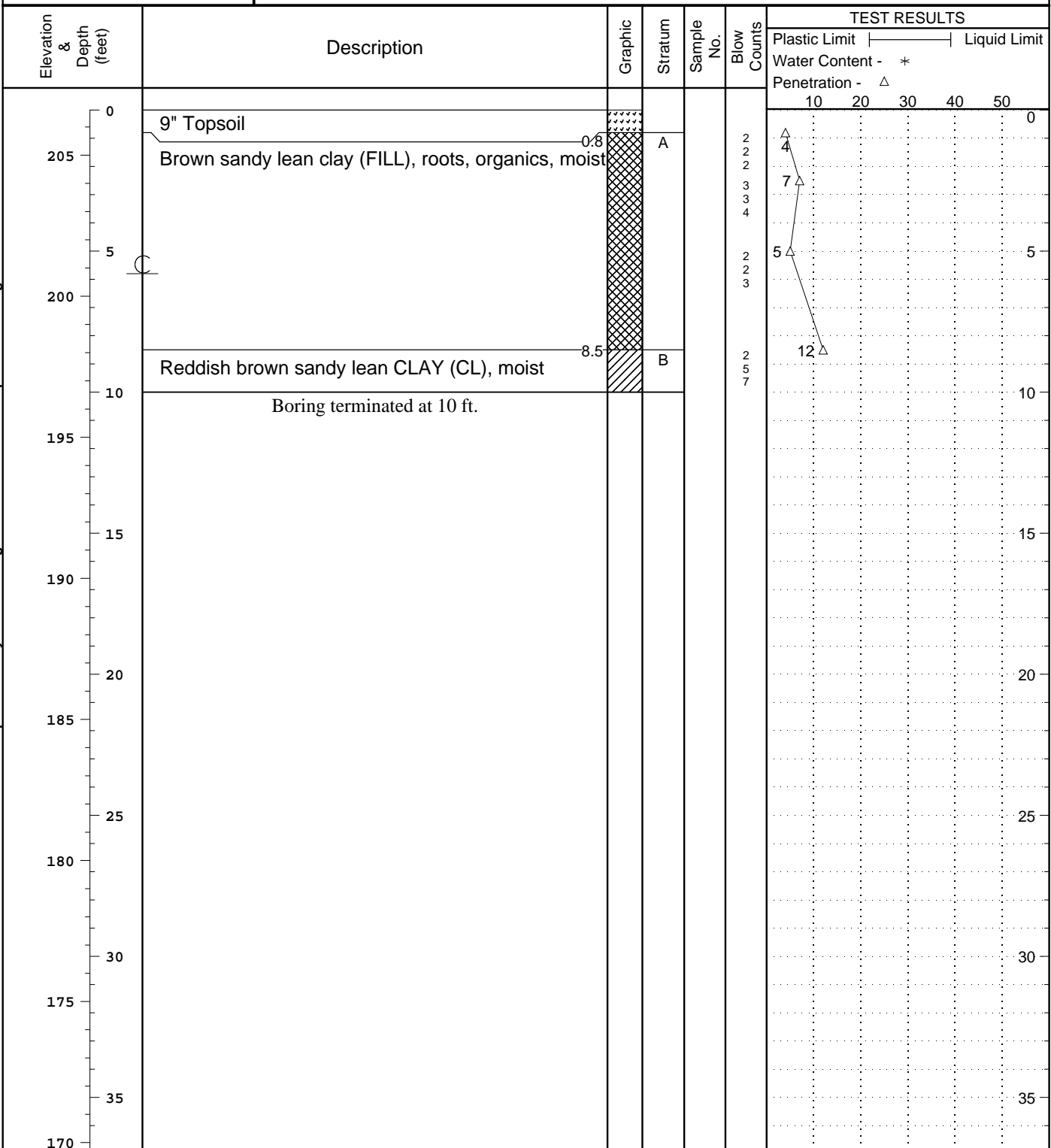
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-21

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 206.6
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 5.8 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



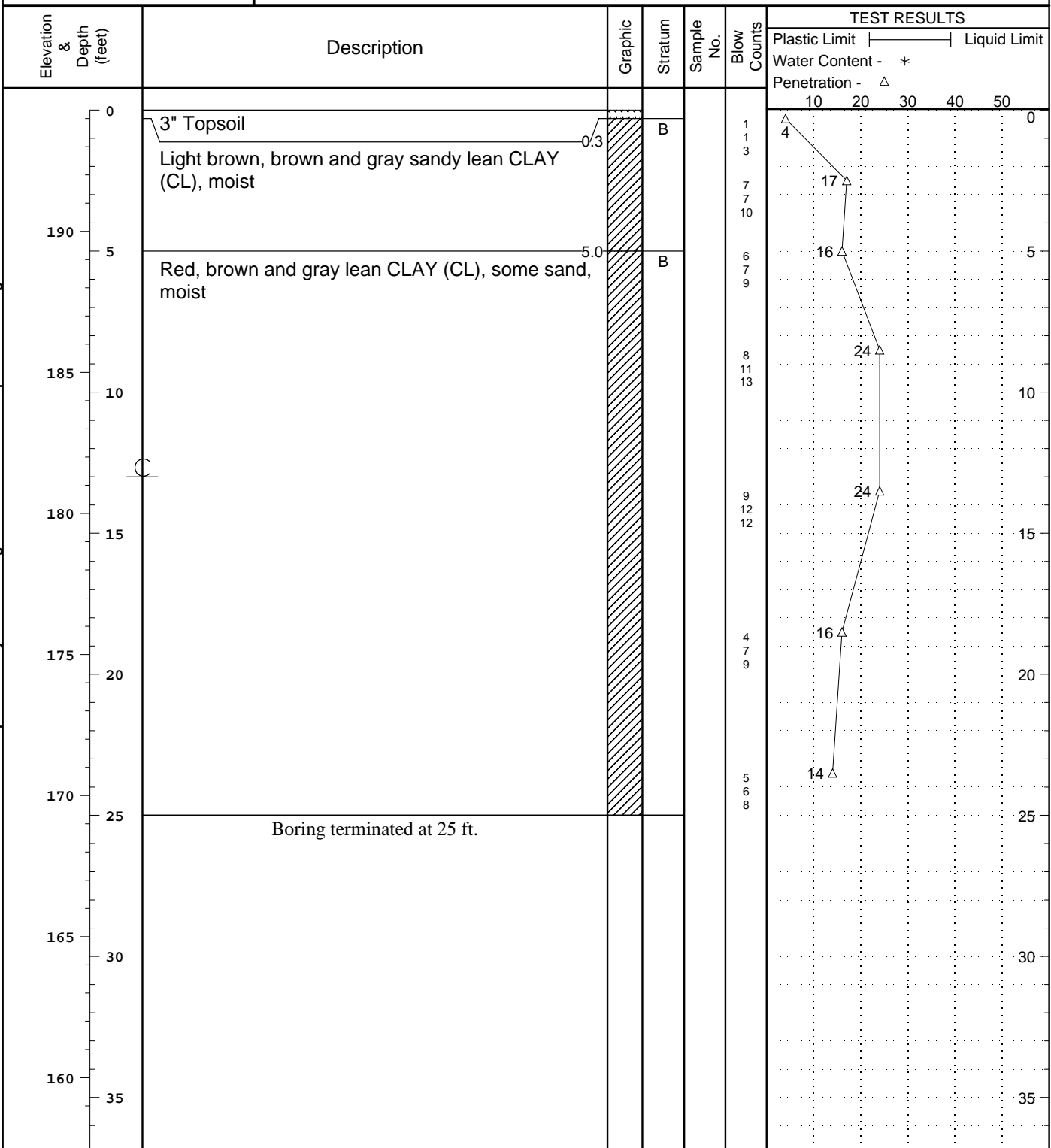
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-22

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 194.3
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-29-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 13 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



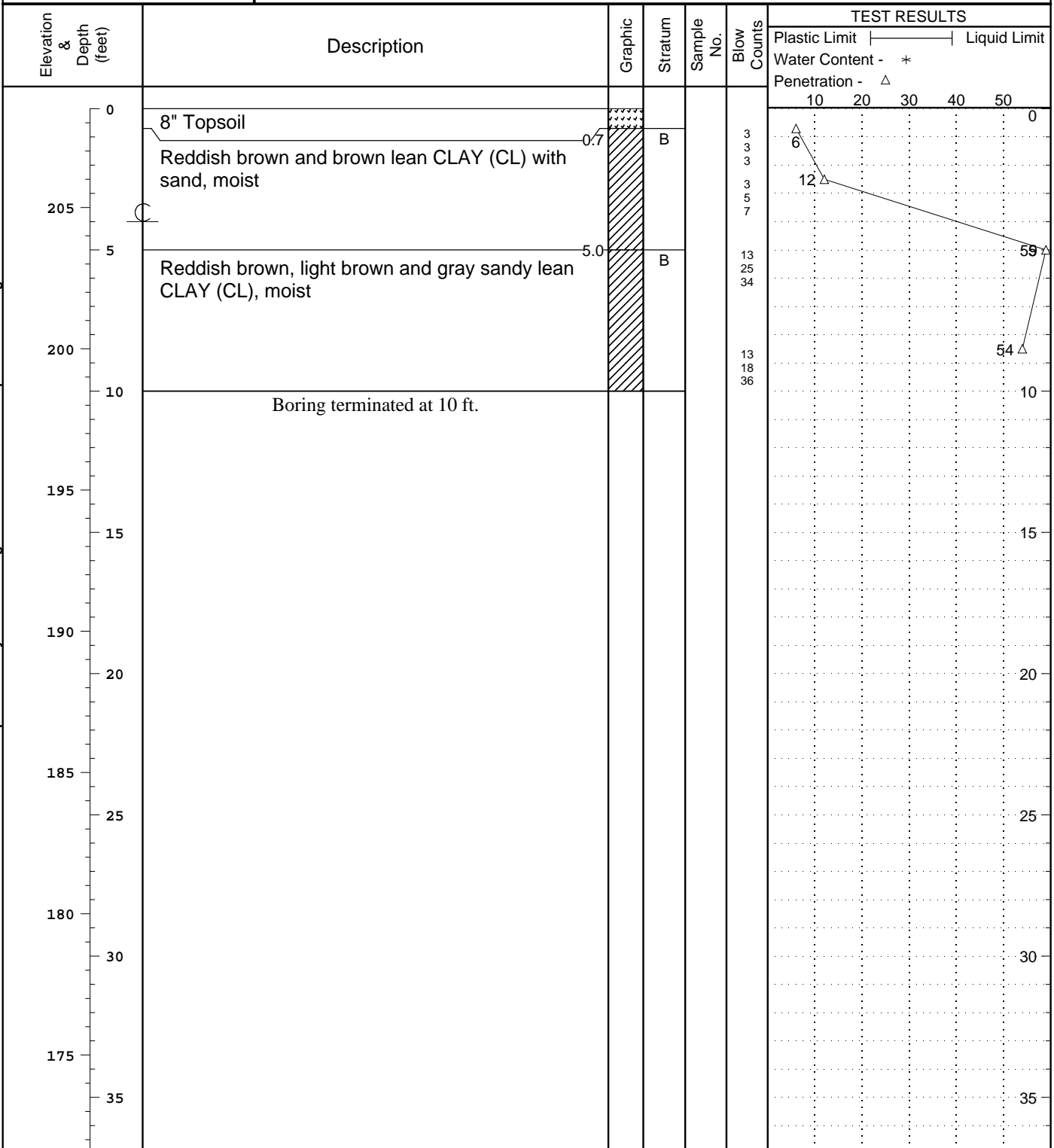
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-23

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 208.5
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 4 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.

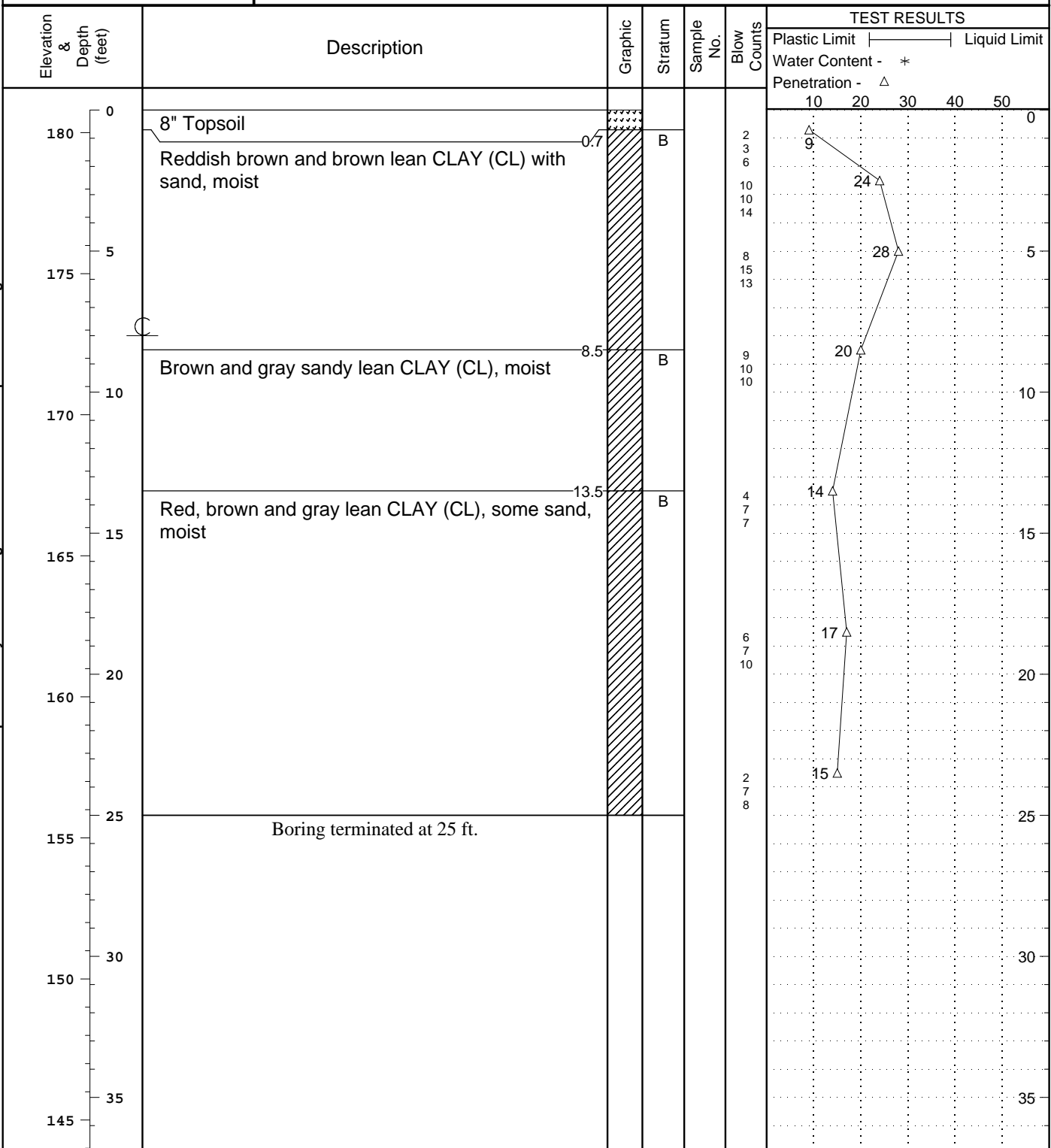


GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-24

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 180.8
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 8 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



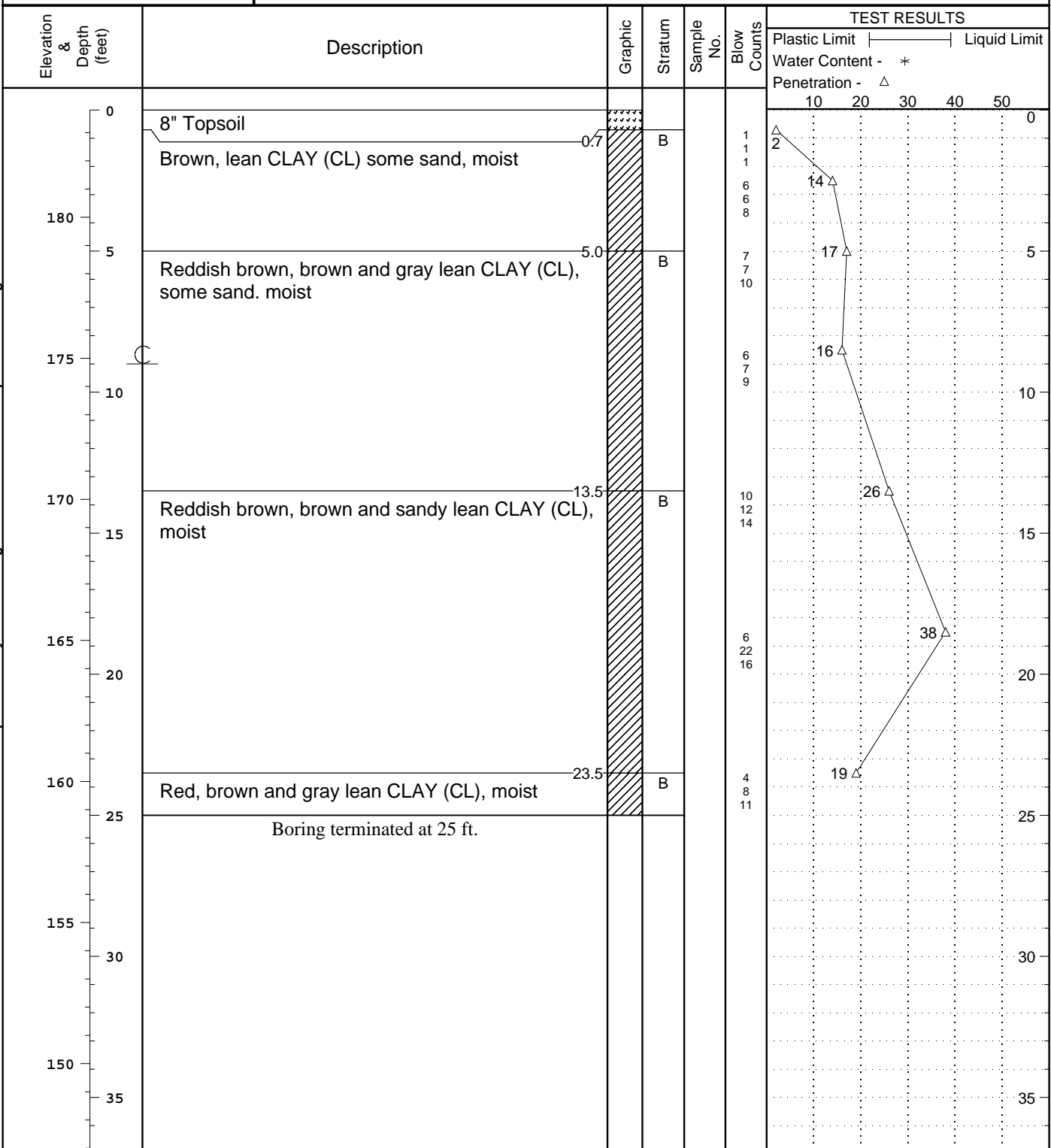
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. B-25

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 183.8
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C 9 ft

This information pertains only to this boring and should not be interpreted as being indicative of the site.



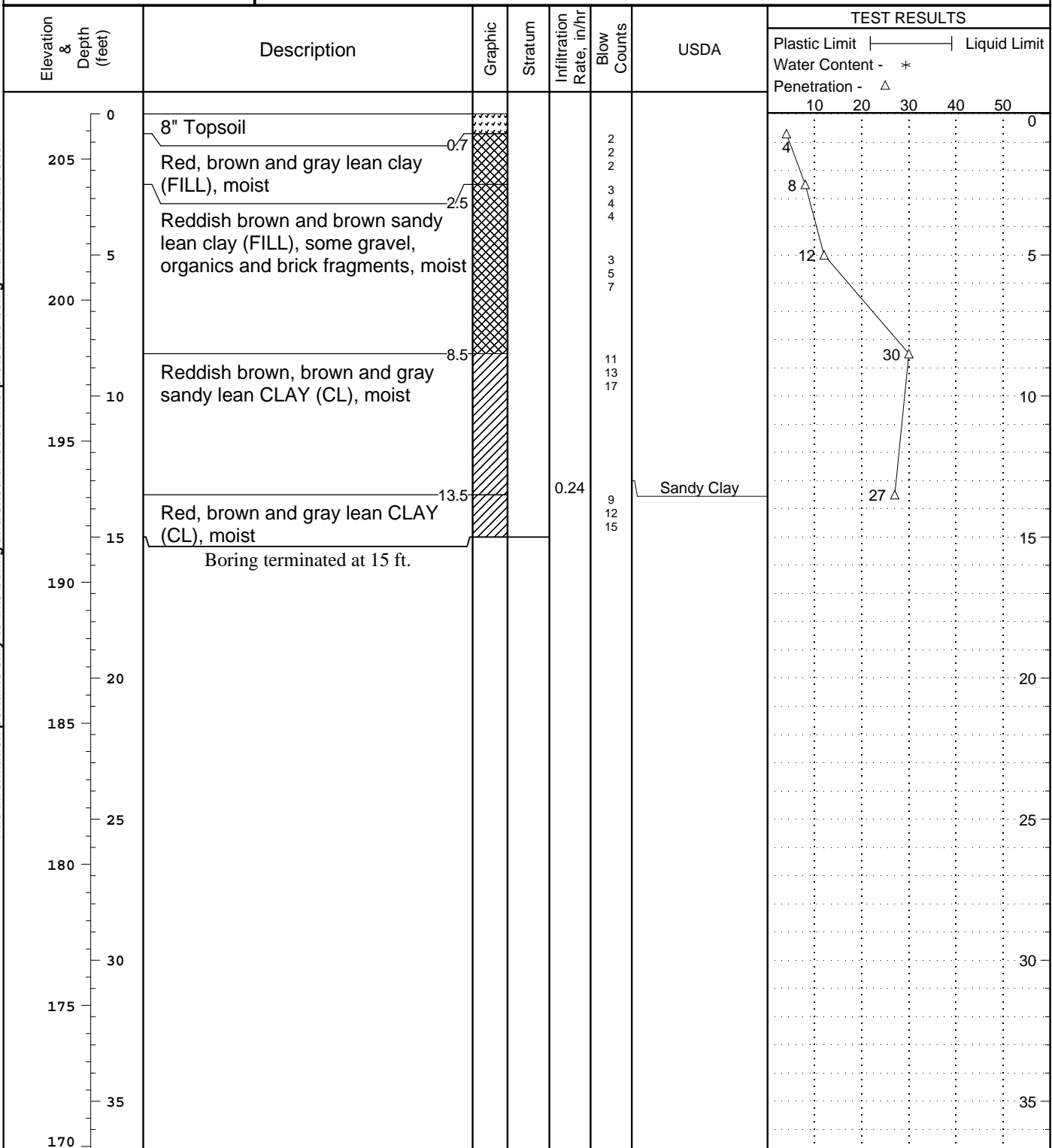
Figure

GEOTECH ENGINEERS, INC.

LOG OF BORING No. I-1

PROJECT: Glenridge MS **PROJECT NO.:** 382474
CLIENT: Grimm and Parker
PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
LOCATION: See plan **ELEVATION:** 206.6
DRILLER: Connelly and Associates, Inc **LOGGED BY:** AB
DRILLING METHOD: Hollow Stem Auger **DATE:** 11-27-18
DEPTH TO - WATER> INITIAL: ☹ None **AFTER 24 HOURS:** ☹ Dry **CAVING>** C N/A

This information pertains only to this boring and should not be interpreted as being indicative of the site.



PVC pipe installed to 15 ft for overnight groundwater reading.

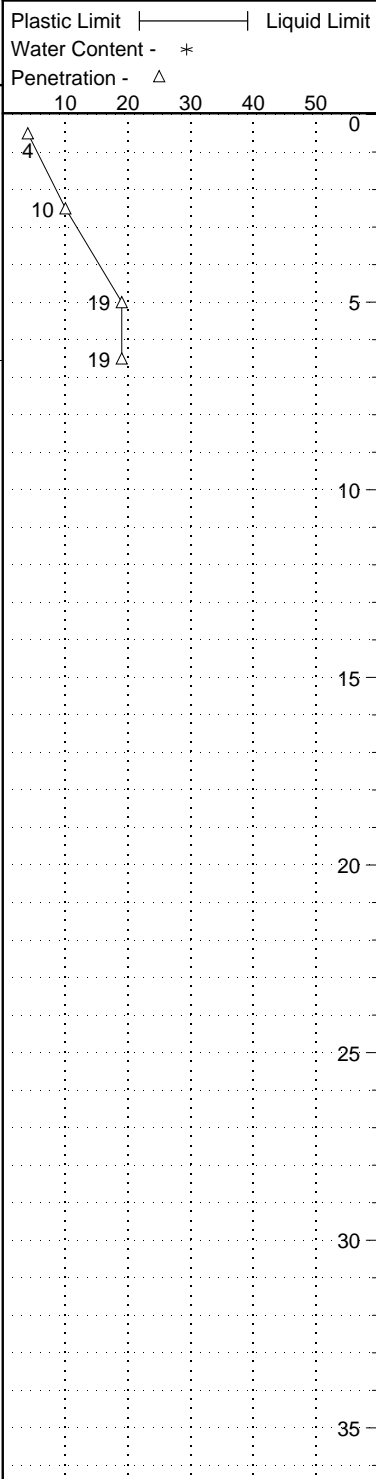
GEOTECH ENGINEERS, INC.

LOG OF BORING No. I-2

PROJECT: Glenridge MS **PROJECT NO.:** 382474
CLIENT: Grimm and Parker
PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
LOCATION: See plan **ELEVATION:** 191.1
DRILLER: Connelly and Associates, Inc **LOGGED BY:** AB
DRILLING METHOD: Hollow Stem Auger **DATE:** 11-28-18
DEPTH TO - WATER> INITIAL: ∇ None **AFTER 24 HOURS:** ∇ Dry **CAVING>** C N/A

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation & Depth (feet)	Description	Graphic	Stratum	Infiltration Rate, in/hr	Blow Counts	USDA	TEST RESULTS	
							Plastic Limit	Liquid Limit
0	6" Topsoil				2			
190	Brown and gray lean CLAY (CL), some sand, moist	0.5			2 2 3 5 5			
185				0.00	6 9 9 9 10	Clay		
180	Boring terminated at 8 ft.							
175								
170								
165								
160								
155								



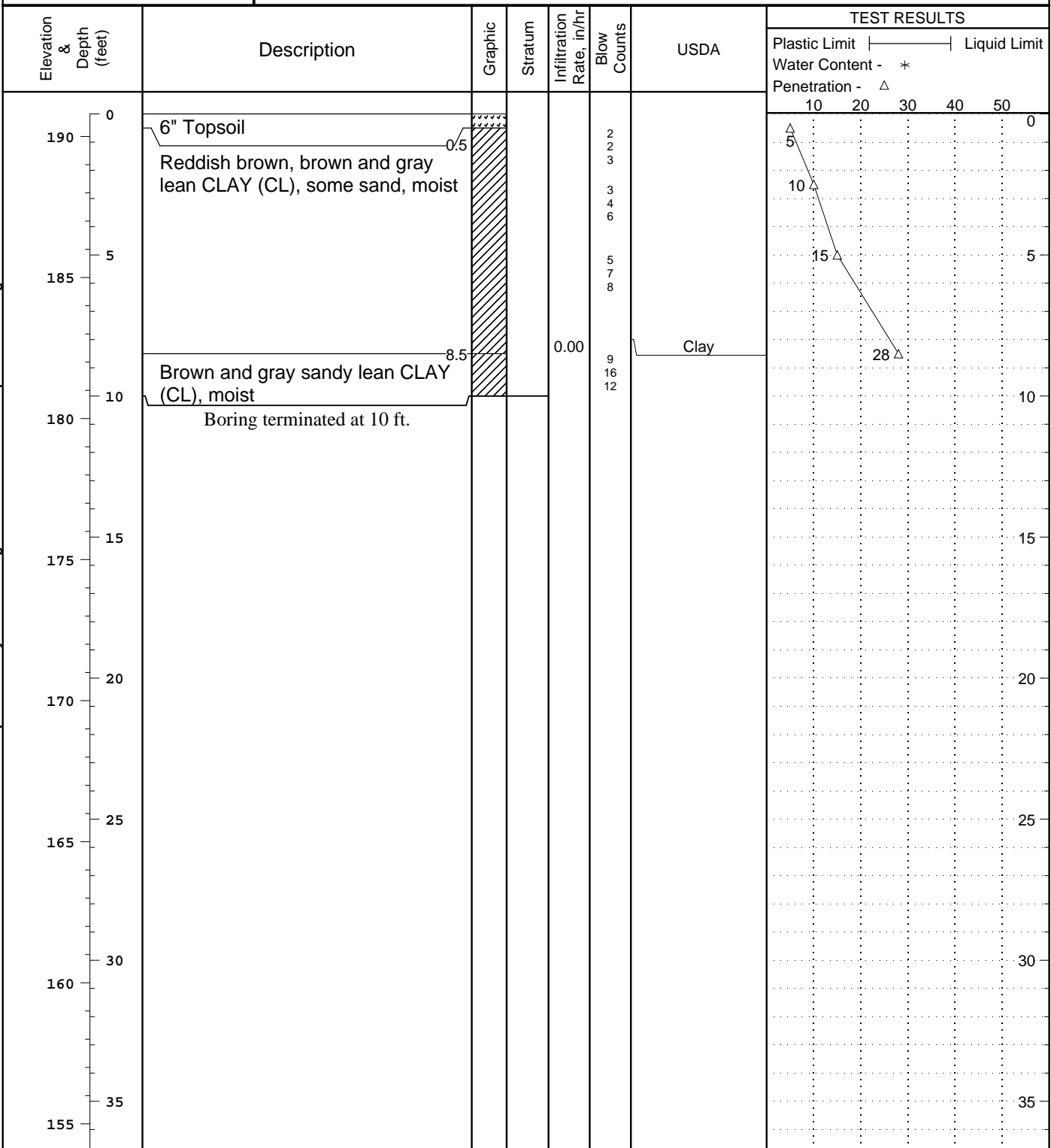
PVC pipe installed to 8 ft for overnight groundwater reading.

GEOTECH ENGINEERS, INC.

LOG OF BORING No. I-3

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 190.8
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-28-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C N/A

This information pertains only to this boring and should not be interpreted as being indicative of the site.



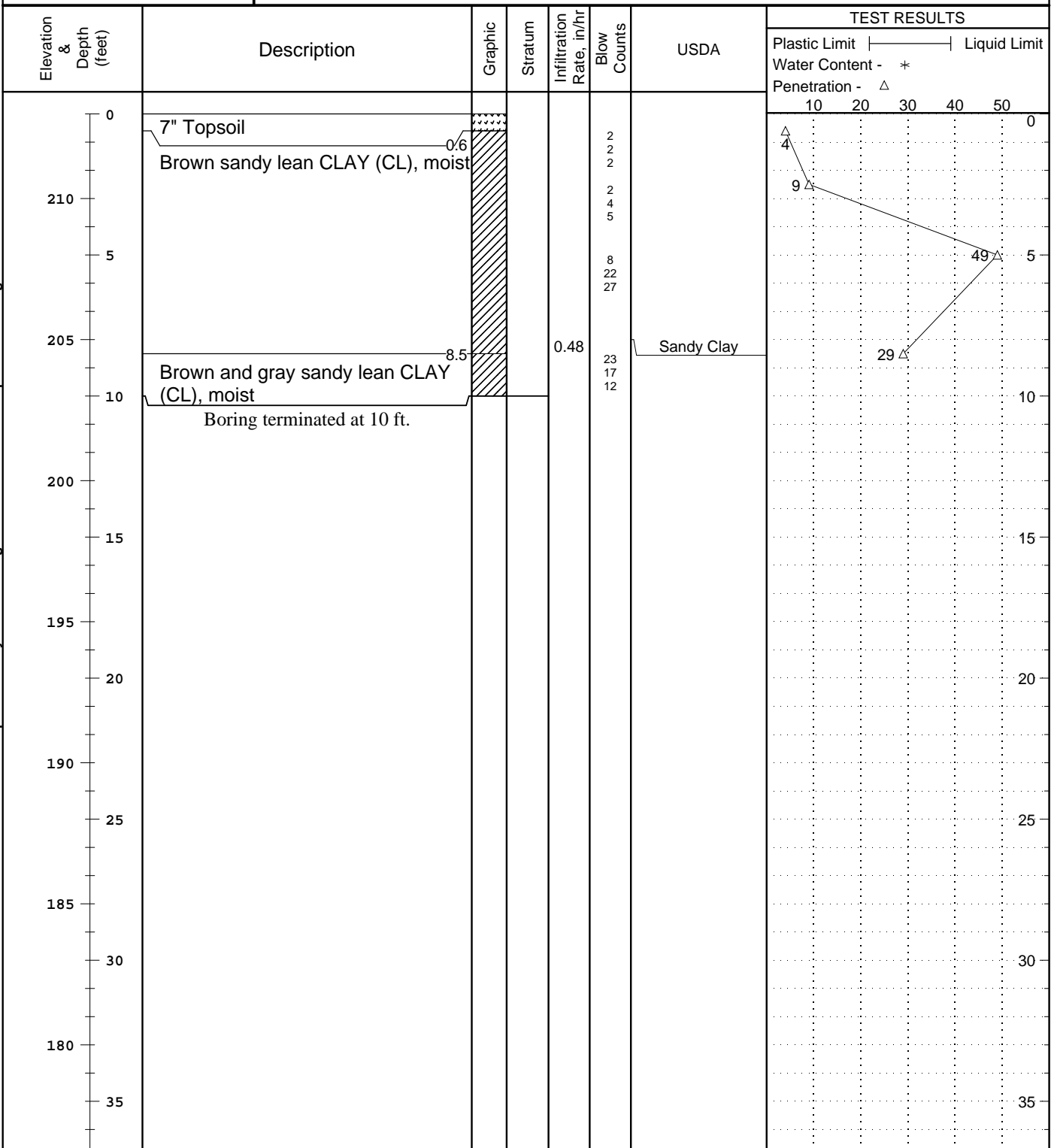
PVC pipe installed to 10 ft for overnight groundwater reading.

GEOTECH ENGINEERS, INC.

LOG OF BORING No. I-4

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 213.0
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-27-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C N/A

This information pertains only to this boring and should not be interpreted as being indicative of the site.



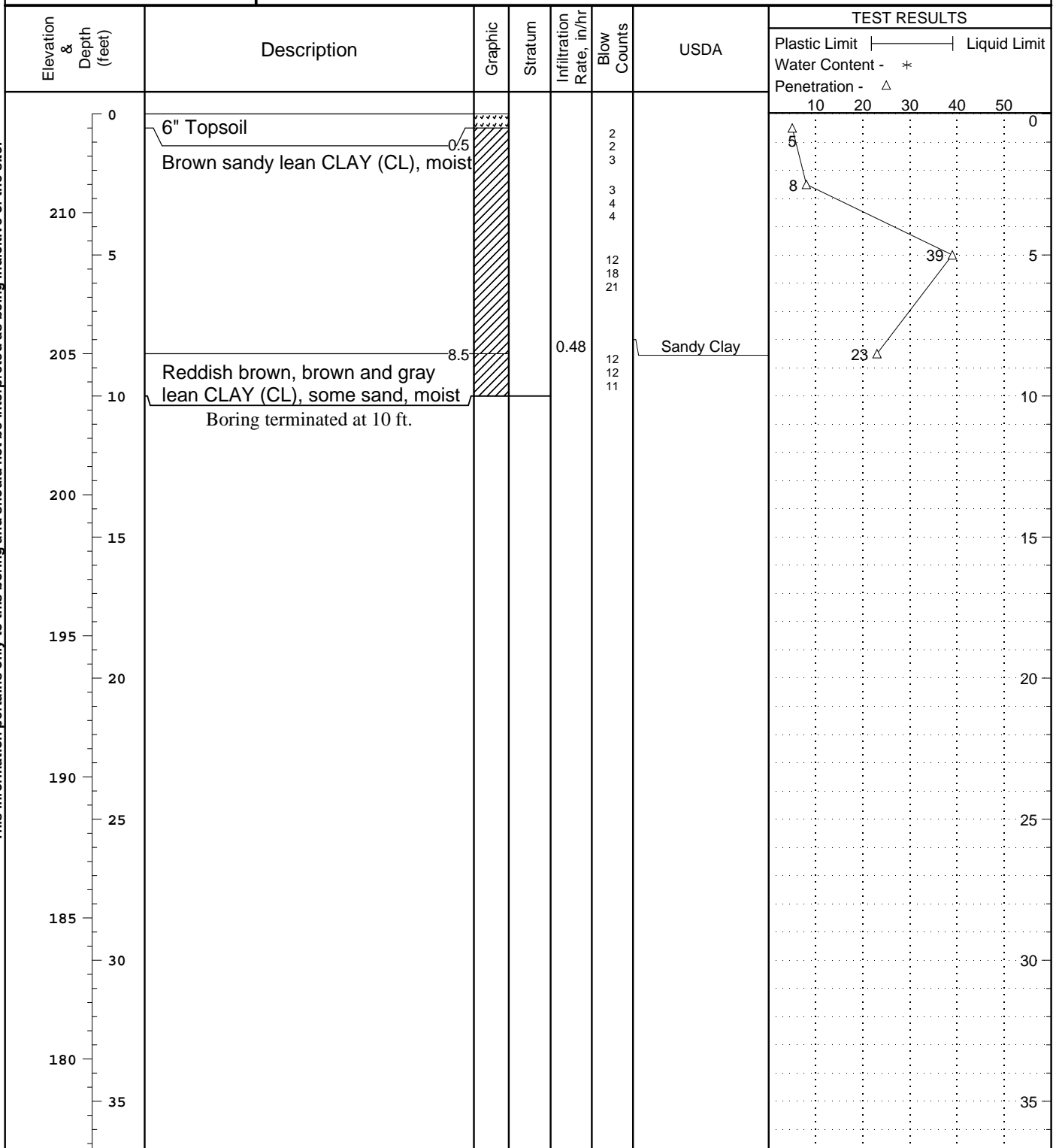
PVC pipe installed to 10 ft for overnight groundwater reading.

GEOTECH ENGINEERS, INC.

LOG OF BORING No. I-5

PROJECT: Glenridge MS **PROJECT NO.:** 382474
CLIENT: Grimm and Parker
PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
LOCATION: See plan **ELEVATION:** 213.5
DRILLER: Connelly and Associates, Inc **LOGGED BY:** AB
DRILLING METHOD: Hollow Stem Auger **DATE:** 11-27-18
DEPTH TO - WATER> INITIAL: ∇ None **AFTER 24 HOURS:** ∇ Dry **CAVING>** C N/A

This information pertains only to this boring and should not be interpreted as being indicative of the site.



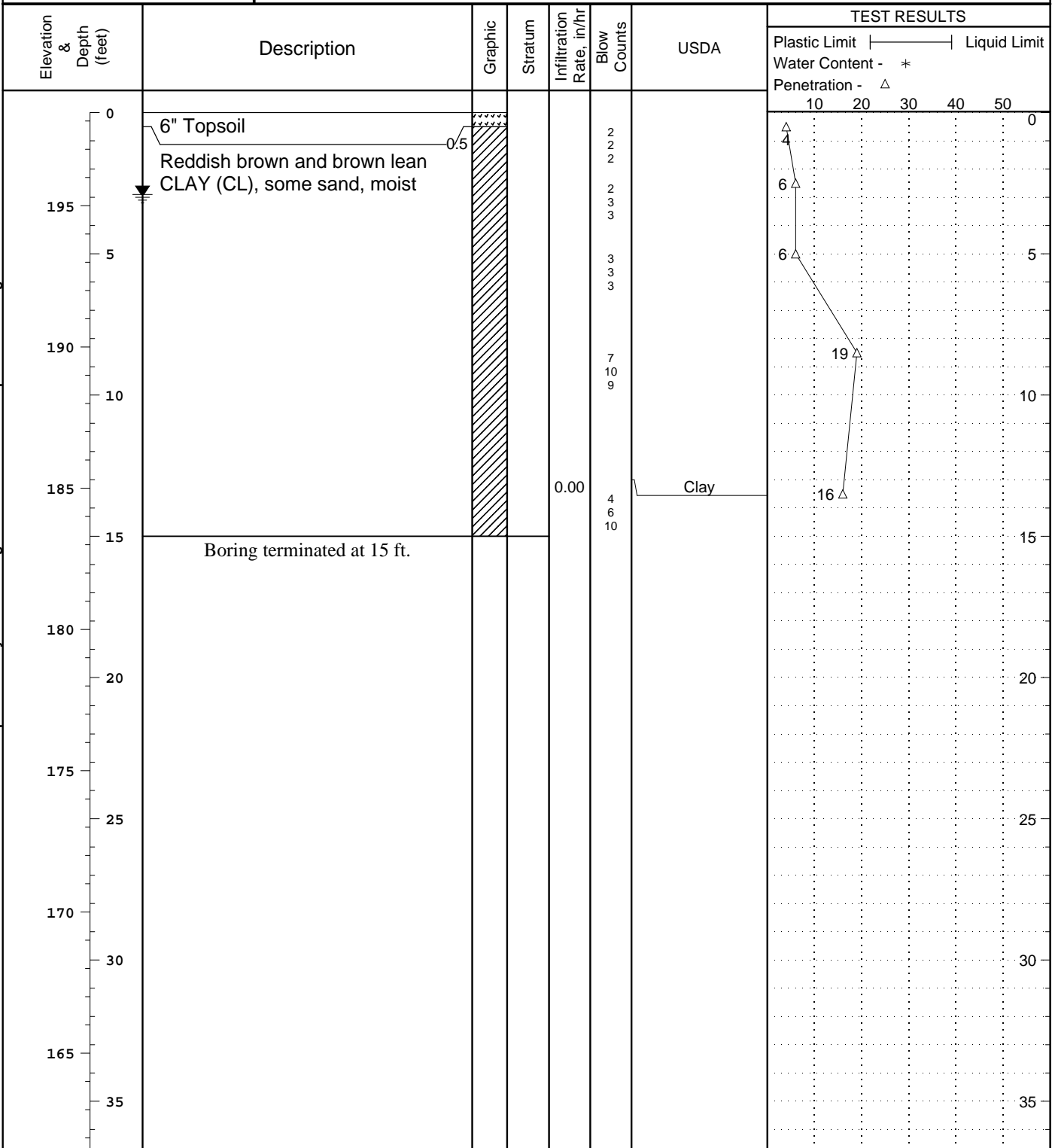
PVC pipe installed to 10 ft for overnight groundwater reading.

GEOTECH ENGINEERS, INC.

LOG OF BORING No. I-6

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 198.3
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-29-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: 2.9 ft CAVING> C N/A

This information pertains only to this boring and should not be interpreted as being indicative of the site.



PVC pipe installed to 15 ft for overnight groundwater reading.

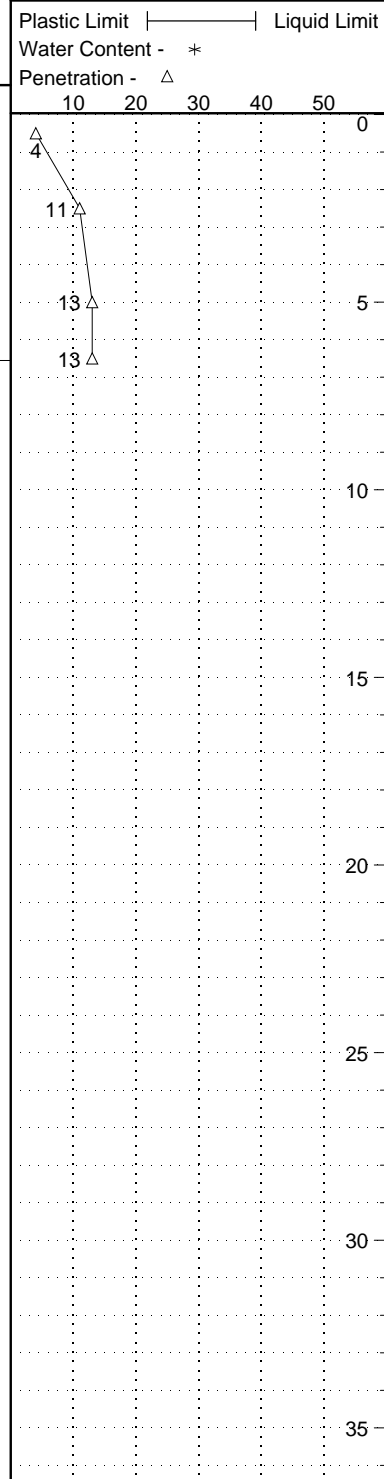
GEOTECH ENGINEERS, INC.

LOG OF BORING No. I-7

PROJECT: Glenridge MS **PROJECT NO.:** 382474
CLIENT: Grimm and Parker
PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
LOCATION: See plan **ELEVATION:** 182.6
DRILLER: Connelly and Associates, Inc **LOGGED BY:** AB
DRILLING METHOD: Hollow Stem Auger **DATE:** 11-29-18
DEPTH TO - WATER> INITIAL: ∇ None **AFTER 24 HOURS:** ∇ Dry **CAVING>** C N/A

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation & Depth (feet)	Description	Graphic	Stratum	Infiltration Rate, in/hr	Blow Counts	USDA	TEST RESULTS	
							Plastic Limit	Liquid Limit
0	6" Topsoil				2			
0.5	Reddish brown and brown lean CLAY (CL), some sand, moist				2			
2.5	Reddish brown, brown and gray lean CLAY (CL), moist				4			
5					4			
5					7	Clay		
5				0.00	4			
5					6			
5					7			
5					5			
5					6			
5					7			
5					7			
5	Boring terminated at 8 ft.							
10								
170								
15								
165								
20								
160								
25								
155								
30								
150								
35								



PVC pipe installed to 8 ft for overnight groundwater reading.

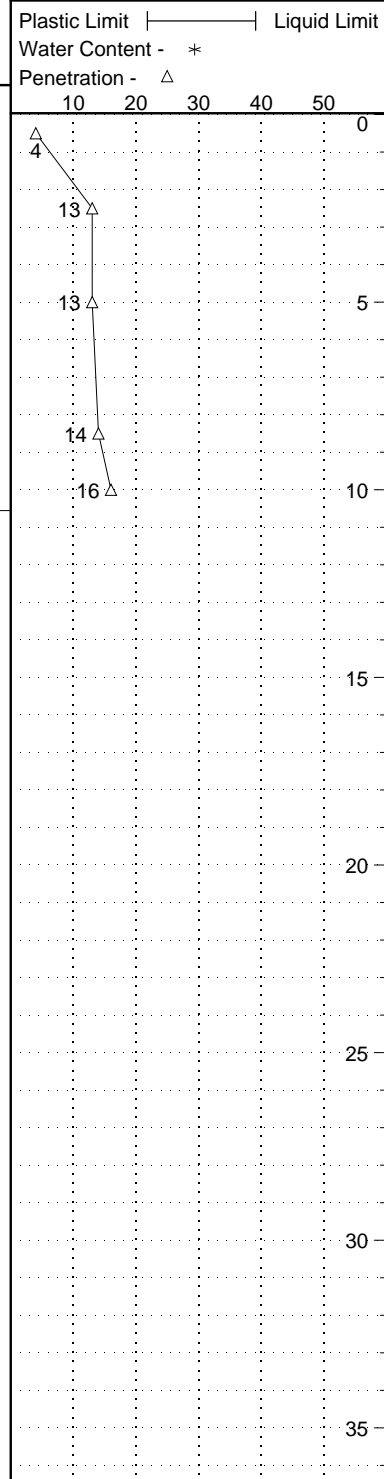
GEOTECH ENGINEERS, INC.

LOG OF BORING No. I-8

PROJECT: Glenridge MS PROJECT NO.: 382474
 CLIENT: Grimm and Parker
 PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
 LOCATION: See plan ELEVATION: 192.9
 DRILLER: Connelly and Associates, Inc LOGGED BY: AB
 DRILLING METHOD: Hollow Stem Auger DATE: 11-29-18
 DEPTH TO - WATER> INITIAL: None AFTER 24 HOURS: Dry CAVING> C N/A

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation & Depth (feet)	Description	Graphic	Stratum	Infiltration Rate, in/hr	Blow Counts	USDA	TEST RESULTS	
							Plastic Limit	Liquid Limit
0	6" Topsoil				2			
0.5	Reddish brown and brown sandy lean CLAY (CL), moist				2			
2.5	Brown and gray lean CLAY, some sand, moist				6			
5					6			
5					7			
185					4			
185					5			
185					8			
10				0.00	5	Clay		
10					7			
10					7			
10					8			
10					8			
180	Boring terminated at 12 ft.							
15								
175								
20								
170								
25								
165								
30								
160								
35								



PVC pipe installed to 12 ft for overnight groundwater reading.

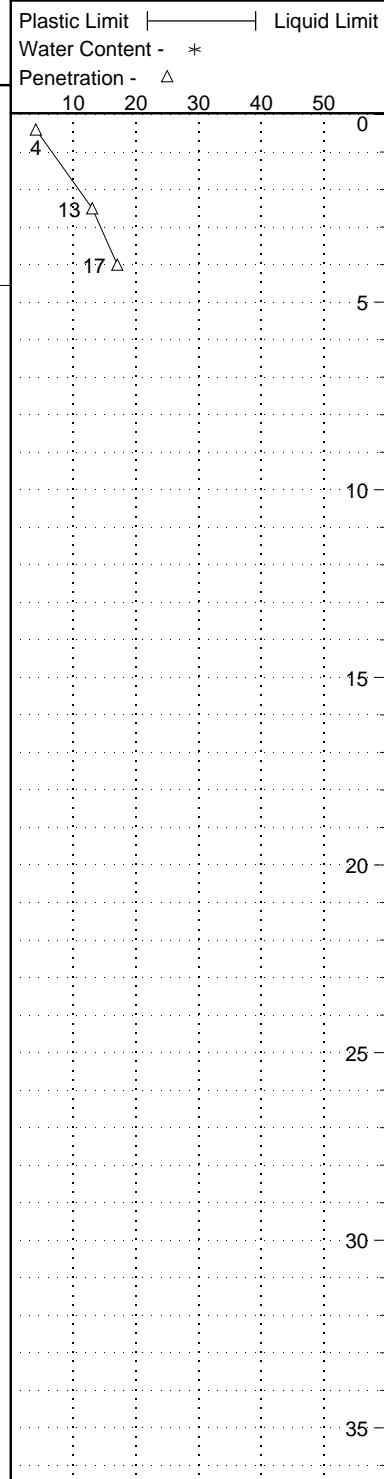
GEOTECH ENGINEERS, INC.

LOG OF BORING No. I-9

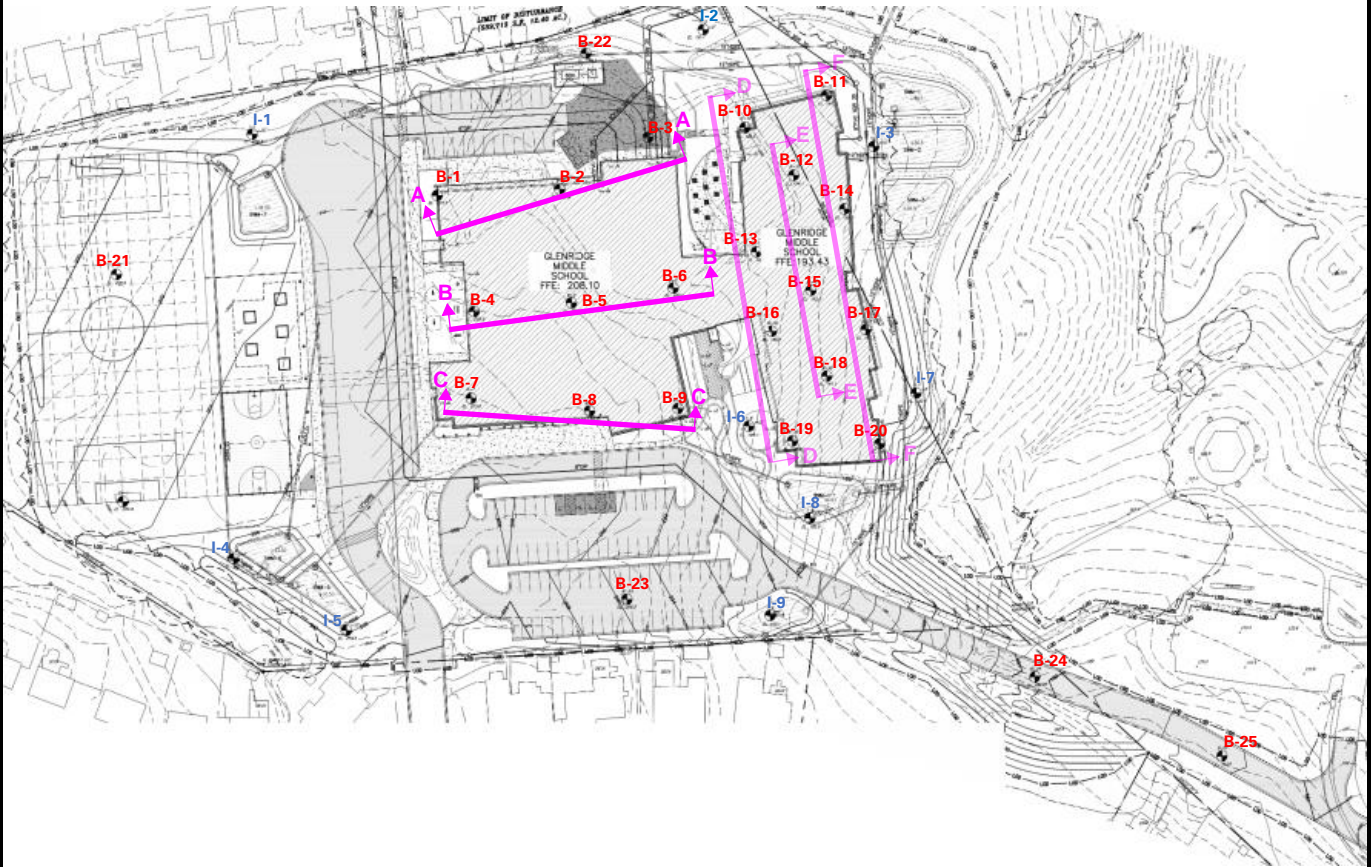
PROJECT: Glenridge MS **PROJECT NO.:** 382474
CLIENT: Grimm and Parker
PROJECT LOCATION: 5211 Flintridge Drive, Hyattsville, MD
LOCATION: See plan **ELEVATION:** 195.1
DRILLER: Connelly and Associates, Inc **LOGGED BY:** AB
DRILLING METHOD: Hollow Stem Auger **DATE:** 11-29-18
DEPTH TO - WATER> INITIAL: None **AFTER 24 HOURS:** Dry **CAVING>** C N/A

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation & Depth (feet)	Description	Graphic	Stratum	Infiltration Rate, in/hr	Blow Counts	USDA	TEST RESULTS	
							Plastic Limit	Liquid Limit
195 0	5" Topsoil				2			
194.4	Reddish brown and brown sandy lean CLAY (CL), moist				2			
192.5	Reddish brown and brown clayey SAND (SC) and gravel, moist			0.00	5	Clay		
190 5	Red, brown and gray lean CLAY (CL), moist				8			
185 10	Boring terminated at 6 ft.				8			
180 15								
175 20								
170 25								
165 30								
160 35								



PVC pipe installed to 6 ft for overnight groundwater reading.



PROJECT NAME: Glenridge MS 5211 Flintridge Drive, Hyattsville, MD	TITLE: Boring Location Plan with Soil Profile Lines	PROJECT NO: 382474
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GEOTECH ENGINEERS, INC.

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Beltsville, MD 20705

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Fax. 301.937.9189

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March 18, 2019

Grimm and Parker Architects
11720 Beltsville Dr., Suite 600
Calverton, MD 20705

Attn: Mr. Jonathan Hill, AIA, ALEP, LEED AP
Vice President

Project: Addendum No. 1
Geotechnical Engineering Report
Glenridge MS
5211 Flintridge Drive,
Hyattsville, MD
(Project No. 382474A)

Dear Mr. Hill:

Submitted herewith is Addendum No. 1 of our geotechnical engineering report dated December 20, 2018 for the above project. This addendum was prepared as requested by Ms. Rachel A. Sternberg of Columbia Engineering Inc. and included are our revised recommendations for the lateral earth pressures.

We understand that lower lateral earth pressures against the basement and retaining walls are required for the design. In our original report, relatively high lateral pressures were recommended due to the presence of high swelling clays.

To reduce the lateral earth pressures on the walls, we recommend that soils classified as SM, SP, SW, or more granular soils according to ASTM D-2487 be placed for backfill behind the walls. With the sand backfill as recommended herein, equivalent fluid pressures of 45H (psf) and 60H (psf) are recommended for design of retaining walls and basement walls, respectively. A recommended lateral earth pressure diagram is attached herein. Any surcharge occurring adjacent to the wall should also be considered as illustrated in the diagram. Note that on-site excavated clays should not be used for backfill behind the walls.

We appreciate the opportunity to be of continued service for this project. Please call the undersigned if you have any questions about this addendum report.

Sincerely,

GEOTECH ENGINEERS, INC.

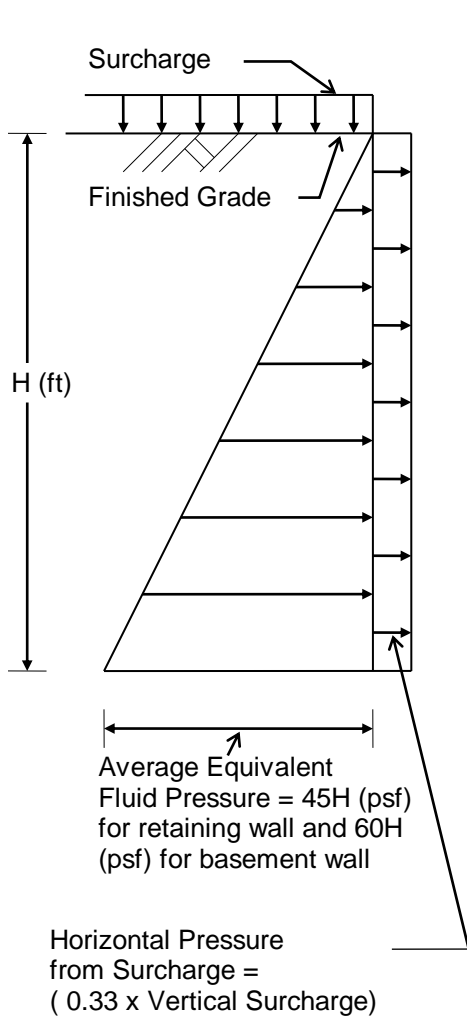
Andre Browne
Project Engineer



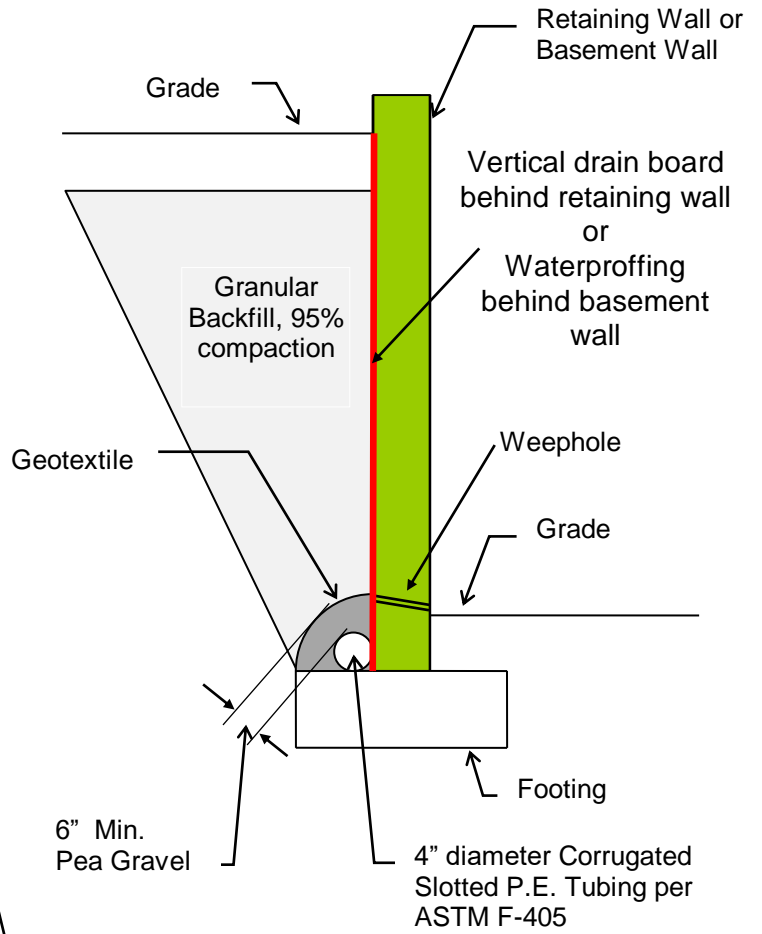
Paul Chung, P.E.
State of Maryland

Encl: Lateral Earth Pressure Diagram

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LATERAL PRESSURE DIAGRAM
NTS



TYPICAL SECTION OF FOOTING DRAIN
NTS

PROJECT NAME:
Glenridge MS
5211 Flintridge Drive,
Hyattsville, MD

TITLE:
Lateral Earth Pressure
Diagram (Revised)

PROJECT NO:
382474 A

SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.2 REFERENCE STANDARDS

- A. ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute.
- B. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.
- C. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.
- D. ACI 347 – Guide to Formwork for Concrete; American Concrete Institute.
- E. ASME A17.1 – Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers.

1.3 SUBMITTALS

- A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on void form materials.
- C. Shop Drawings: Indicate pertinent dimensions, materials, bracing and arrangement of joints and ties.
 - 1. Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Shop drawings shall be signed and sealed by an engineer registered in the local jurisdiction.
 - 2. Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.
 - 3. Indicate location of all slab joint types.
- D. LEED Submittals: If any wood or wood-based form materials, including supports, are permanently installed in the project, submit documentation required for sustainably harvested wood as required by Section 01 60 00 and appropriate forms.

1.4 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.
 - 1. Maintain one copy of standards on project site.

PART 2 - PRODUCTS**2.1 FORMWORK – GENERAL**

- A. Provide concrete forms, accessories, shoring and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

- C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.
- D. Comply with relevant portions of ACI 347, ACI 301 and ACI 318.

2.2 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor.

2.3 PREFABRICATED FORMS

- A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- C. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 2 inches thick.

2.4 FORMWORK ACCESSORIES

- A. Form Ties: Snap-off type, galvanized metal, fixed length, cone type, with waterproofing washer, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture, impair natural bonding of concrete finish coatings, or affect color characteristics of concrete finish coatings.
- C. Corners: Chamfered, rigid plastic or wood strip type, $\frac{3}{4}$ x $\frac{3}{4}$ inch size, maximum possible lengths.
- D. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- G. Waterstops: Preformed mineral colloid strips, $\frac{3}{4}$ inch thick, moisture expanding.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 ERECTION – FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Provide chamfer strips on external corners of beams, joists, and columns.

- D. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.
- E. Coordinate this section with other sections of work that require attachment of components to formwork.
- F. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.4 APPLICATION – FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS AND OPENINGS

- A. Provide formed openings where required for items to be embedded or passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
 - 1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
 - 2. During cold weather, remove ice and snow from within forms. Do not use deicing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117, unless more stringent tolerances are required within the contract documents.
- B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

3.8 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to the Statement of Special Inspections noted in the structural drawings.

- B. Inspect erected formwork, shoring and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
- C. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.9 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finished concrete surfaces scheduled for exposure to view.
- C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03 20 00 - CONCRETE REINFORCING**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.2 REFERENCE STANDARDS

- A. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.
- B. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.
- C. ACI SP-66 – ACI Detailing Manual; American Concrete Institute.
- D. ASTM A 615/A 615M – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- E. ASTM A 1064/A 1064M – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain, Deformed, for Concrete.
- F. CRSI (DA4) – Manual of Standard Practice; Concrete Reinforcing Steel Institute.
- G. CRSI (P1) – Placing Reinforcing Bars; Concrete Reinforcing Steel Institute.

1.3 SUBMITTALS

- A. See Section 01 30 00: Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.
- E. LEED Report: Accurately document the use of recycled materials and local/regional materials as required by Section _____ and appropriate forms.
 - 1. Provide documentation of recycled content type and percentage, by cost, location of extraction/recovery/harvest of primary raw materials, location of mill, and location of fabrication.
 - 2. All reinforcing steel shall be extracted/recovered/harvested and manufactured within 500 miles of the project site.

1.4 QUALITY ASSURANCE

- A. Perform work of this section in accordance with CRSI (DA4), CRSI (P1), ACI 301, ACI SP-66, and ACI 318.
 - 1. Maintain one copy of each document on the project site.

PART 2 - PRODUCTS**2.1 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
- B. Steel Welded Wire Reinforcement: ASTM A 1064/A 1064M, plain type.

1. Flat sheets.
2. Mesh Size and Wire Gage: As indicated on drawings.
- C. Reinforcement Accessories:
 1. Tie Wire: Annealed, minimum 16 gage.
 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 3. Supports and Spacers in Contact with the Ground:
 - a. Precast concrete supports with a surface area of not less than 4 in², a compressive strength equal to or greater than the specified compressive strength of the concrete being placed, and embedded tie wires for securing the reinforcement.
 - b. Chairs with plastic components and sand plates.
 - c. Spacers: Plastic.
 4. Provide stainless steel components for placement within 1½ inches of weathering surfaces.

2.2 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) – Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
 1. Review location of splices with Architect.

PART 3 - EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement before and during concrete placement. Do not deviate from required position.
- B. Clean reinforcement of loose rust, mill scale, earth, ice and other foreign materials that would reduce bond to concrete.
- C. Do not displace or damage vapor barrier.
- D. Accommodate placement of formed openings.
- E. Conform to structural drawings for concrete cover over reinforcement.

3.2 FIELD QUALITY CONTROL

- A. An independent inspection agency, as specified in Section 01 40 00, will inspect installed reinforcement for conformance to contract documents before placing concrete. Inspection services shall conform to the Statement of Special Inspections noted in the structural drawings.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Concrete for composite floor construction.
- B. Floors and slabs on grade.
- C. Concrete foundation walls and building walls.
- D. Footings.
- E. Grade beams.
- F. Pile caps.
- G. Columns and piers.
- H. Joint devices associated with concrete work.
- I. Miscellaneous concrete elements, including equipment pads.

1.2 RELATED REQUIREMENTS

- A. Section 03 10 00 – Concrete Forming and Accessories.
- B. Section 03 20 00 – Concrete Reinforcing.
- C. Section 03 35 13 – High Tolerance Concrete Floor Finishing.
- D. Section 03 39 00 – Concrete Curing.
- E. Section 07 95 13 – Expansion Joint Cover Assemblies.
- F. Section 07 90 05 – Joint Sealers.

1.3 REFERENCE STANDARDS

- A. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute.
- B. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; American Concrete Institute.
- C. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.
- D. ACI 302.1R – Guide for Concrete Floor and Slab Construction; American Concrete Institute.
- E. ACI 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute.
- F. ACI 305R – Hot Weather Concreting; American Concrete Institute.
- G. ACI 306R – Cold Weather Concreting; American Concrete Institute.
- H. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.
- I. ASTM C 33 – Standard Specification for Concrete Aggregates.
- J. ASTM C 39/C 39M – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- K. ASTM C 94/C 94M – Standard Specification for Ready-Mixed Concrete.
- L. ASTM C 150 – Standard Specification for Portland Cement.
- M. ASTM C 173/C 173M – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

- N. ASTM C 260 – Standard Specification for Air-Entraining Admixtures for Concrete.
- O. ASTM C 330 – Standard Specification for Lightweight Aggregates for Structural Concrete.
- P. ASTM C 494/ C 494M – Standard Specification for Chemical Admixtures for Concrete.
- Q. ASTM C 618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- R. ASTM C 881/C 881M – Standard Specification for Epoxy-Resin Base Bonding Systems for Concrete.
- S. ASTM C 989 – Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
- T. ASTM C 1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- U. ASTM C 1107/C 1107M – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).
- V. ASTM C 1240 – Standard Specification for Silica Fume Used in Cementitious Mixtures.
- W. ASTM D 1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types).
- X. ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials.
- Y. ASTM E 329 – Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction.
- Z. IBC 2015 – International Building Code.

1.4 SUBMITTALS

- A. See Section 01 30 00 – Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's data on manufactured products showing compliance with specified requirements.
- C. Samples: Submit samples of under-slab vapor retarder to be used.
- D. Design Mixtures:
 - 1. Submit for each concrete mixture.
 - 2. Submit alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 3. Indicate amounts of mixing water to be withheld for later addition at project site.
- E. LEED Submittals: If any ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix design to replace Portland cement, submit the total volume of cast-in-place concrete, mix design(s) used showing the quantity of Portland cement replaced, reports showing successful cylinder testing and temperature on day of pour if cold weather mix is used; use LEED New Product Content Form.
- F. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section _____ and appropriate forms.
- G. LEED Submittal: Provide documentation of VOC content in g/L for adhesives and sealants applied within the building waterproofing envelope.

1.5 QUALITY ASSURANCE

- A. Concrete Producer: Engage a firm with experience in producing concrete similar to that indicated for this project and within 15 percent of this project size, with a record of successful

in-service performance as well as sufficient production capacity to supply concrete without delaying the work.

1. Provide documentation that concrete producer has supplied concrete for at least 3 projects within 15 percent of project size and complexity in the last six years.
- B. Concrete Contractor: Engage a firm with experience in placing and finishing concrete similar to that indicated for this project and within 15 percent of this project size, with a record of successful in-service performance.
 1. Provide documentation that the concrete contractor has installed concrete for at least 3 projects within 15 percent of project size and complexity in the last six years.
- C. Perform work of this section in accordance with ACI 301 and ACI 318.
 1. Maintain one copy of each document on site.
- D. Follow recommendations of ACI 305R when concreting during hot weather.
- E. Follow recommendations of ACI 306R when concreting during cold weather.
- F. All form release agents and membrane curing compounds used for slabs and walls that are to be waterproofed shall be submitted to the manufacturer of hot fluid waterproofing system for compatibility review prior to application.
- G. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1.
 2. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

PART 2 - PRODUCTS

2.1 FORMWORK

- A. Comply with requirements of Section 03 10 00.

2.2 REINFORCEMENT

- A. Comply with requirements of Section 03 20 00.

2.3 CONCRETE MATERIALS

- A. Cement – ASTM C 150 Type 1 – Normal Portland type.
 1. Acquire all cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C 33.
 1. Acquire all aggregates for entire project from same source.
- C. Lightweight Aggregate: ASTM C 330.
- D. Ground Granulated Blast Furnace Slag: ASTM C 989, Grade 100 or 120.
- E. Fly Ash: ASTM C 618 Class F.
- F. Calcined Pozzolan: ASTM C 618 Class N.
- G. Silica Fume: ASTM C 1240.
- H. Water: Clean and not detrimental to concrete.
- I. Regional Materials: Provide cement and aggregate manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.

2.4 CHEMICAL ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C 260.
- C. High Range Water Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
- D. High Range Water Reducing Admixture: ASTM C 494/C 494M, Type F.
- E. Water Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
- F. Water Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
- G. Accelerating Admixture: ASTM C 494/C 494M, Type C.
- H. Retarding Admixture: ASTM C 494/C 494M, Type B.
- I. Water Reducing Admixture: ASTM C 494/C 494M, Type A.

2.5 ACCESSORY MATERIALS

- A. Underslab Vapor Barrier / Vapor Retarder: Comply with ASTM E 1745, Class A.
 - 1. Maximum Permeance ASTM E 96: 0.018 perms (English).
 - 2. Provide standard accessories and tape for complete system.
 - 3. Acceptable Products:
 - a. Stego Wrap (15-mil) Vapor Barrier by Stego Industries LLC.
 - b. Perminator: 15 mils by W.R. Meadows, Inc.
 - c. 15 Mil Green by Reef Industries, Inc.
 - d. Vapor Block 15 by Raven Industries.
 - e. Yellow Guard 15-mil Vapor Barrier by Poly-America.
 - 4. Single ply polyethylene is prohibited.
- B. Non-Shrink Grout: ASTM C 1107/C 1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 48 Hours: 2,400 psi.
 - 2. Minimum Compressive Strength at 28 Days: 7,000 psi.
- C. Curing Materials: Comply with requirements of Section 03 39 00.

2.6 BONDING AND JOINTING PRODUCTS

- A. Bonding Agent: Epoxy bonding system complying with ASTM C 881/C 881M and of Type required for specific application.
- B. Waterproofing Admixture Slurry: Slurry coat of Portland cement, sand, and crystalline waterproofing additive, mixed with water in proportions recommended by manufacturer to achieve waterproofing at cold joints in concrete.
 - 1. Manufacturers:
 - a. Aquafin, Inc.: www.aquafin.net.
 - b. Xypex Chemical Corporation: www.xypen.com.
 - c. Kryton International Inc: www.kryton.com.
- C. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophilic material for adhesive bonding to concrete.
 - 1. Available Products:
 - a. Volclay Waterstop-RX: Colloid Environmental Technologies Co.
 - b. Conseal CS-231: Concrete Sealants Inc.
 - c. Swellseal Joint: De Neef Construction Chemicals (U.S.) Inc.
 - d. Hydrotite: Greenstreak.

- e. Mirastop: Mirafil Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
 - f. Adeka Ultra Seal: Mitsubishi International Corporation.
 - g. Superstop: Progress Unlimited Inc.
- D. Joint Filler: Non-extruding, resilient asphalt impregnated fiberboard, cork or flexible foam, complying with ASTM D 1751, thickness as indicated on drawings and full depth of slab less ½ inch; tongue and groove profile.
- E. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum 1 inch diameter holes for conduit or rebars to pass through at 6 inches on center, ribbed steel stakes for setting.
- 1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
 - 2. Height: To suit slab thickness.
- F. Sealant and Primer: As specified in Section 07 90 05.

2.7 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- 1. Replace no less than 30% and no more than 50% of Portland cement in structural concrete with approved pozzolanic materials.
 - 2. Ground Granulated Blast Furnace Slag Content: Not to exceed 50% of cementitious material by weight.
 - 3. Fly Ash or Calcined Pozzolan Content: Not to exceed 25% of cementitious material by weight.
 - 4. Silica Fume Content: Not to exceed 10% of total cementitious material by weight.
 - 5. Obtain approval in advance before submitting mix containing any other pozzolanic substances.
- B. Proportioning Lightweight Concrete: Comply with ACI 211.2 recommendations.
- 1. Replace no less than 30% and no more than 50% of Portland cement in structural concrete with approved pozzolanic materials.
 - 2. Ground Granulated Blast Furnace Slag Content: Not to exceed 50% of cementitious material by weight.
 - 3. Fly Ash or Calcined Pozzolan Content: Not to exceed 25% of cementitious material by weight.
 - 4. Silica Fume Content: Not to exceed 10% of total cementitious material by weight.
 - 5. Obtain approval in advance before submitting mix containing any other pozzolanic substances.
- C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
- 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- D. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- E. Normal Weight Concrete:
- 1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: As indicated on drawings.
 - 2. Water-Cementitious Materials Ratio: Maximum 58% by weight. Maximum 40% by weight for exterior concrete.
 - a. Interior slabs shall have a maximum water-cementitious material ratio of 50% by weight.

3. Entrained air content for trowel-finished interior slabs shall not exceed 3%, determined in accordance with ASTM C 173/C 173M.
 4. Entrained air content for footings shall not exceed 4.5%, determined in accordance with ASTM C 173/C 173M
 5. Air Content for Exterior Exposed Concrete: Add air entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows with a tolerance of plus 1 or minus 1.5%, unless otherwise indicated.
 - a. Air Content: 6% entrained air, determined in accordance with ASTM C 173/C 173M.
 6. Maximum Slump: 4 inches.
 7. Maximum Aggregate Size: 1 inch.
- F. Structural Lightweight Concrete:
1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days:
As indicated on drawings.
 2. Maximum Slump: 4 inches.
 3. Maximum Aggregate Size: 5/8 inch.
 4. Maximum Dry Unit Weight: 115 lb, per cubic foot.

2.8 MIXING

- A. Transit Mixers: Comply with ASTM C 94/C 94M.
- B. Do not add water to concrete during delivery, at the project site or during placement except as predetermined by concrete mix, unless approved by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 PREPARATION

- A. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent, as indicated on the drawings, in accordance with the manufacturer's instructions.
- B. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.
- C. In locations where new concrete is doveled to existing work, drill holes in existing concrete and insert steel dowels using an epoxy adhesive approved by the Architect.
- D. Install vapor retarder under interior slabs on grade in accordance with manufacturer's instructions and ASTM E 1643.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- D. Separate slabs on grade from vertical surfaces with joint filler.

- E. Place joint filler in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- F. Extend joint filler from bottom of slab to within ½ inch of finished slab surface. Conform to Section 07 90 05 for finish joint sealer requirements.
- G. Install joint devices in accordance with manufacturer's instructions.
- H. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- I. Install joint device anchors for expansion joint assemblies specified in Section 07 95 13. Maintain correct position to allow joint cover to be flush with floor and wall finish.
- J. Apply sealants in joint devices in accordance with Section 07 90 05.
- K. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.
- L. Place concrete continuously between predetermined expansion, control and construction joints.
- M. Do not interrupt successive placement. Do not permit cold joints to occur.
- N. Place slabs on grade with saw cut pattern indicated.
- O. Saw cut joints as soon as the concrete is firm enough not to be damaged by the cutting action. Use 3/16 inch thick blade, cut into ¼ depth of slab thickness.

3.4 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas ¼ inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas ¼ inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Concrete Slabs: Finish to requirements of Section 03 35 13.

3.5 CURING AND PROTECTION

- A. Comply with requirements of Section 03 39 00.

3.6 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.3 and Table 1705.3 of the 2015 IBC Code and the Statement of Special Inspections noted in the structural drawings. The exceptions noted in Section 1705.3 shall not be allowed.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm; inspection to occur for:
 - 1. Steel reinforcement placement.
 - 2. Anchor bolts and studs.
 - 3. Verification of use of required design mixture.
 - 4. Concrete placement, including conveying and depositing.
 - 5. Curing procedures and maintenance of curing temperature.
 - 6. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

- D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- E. Test composite samples of fresh concrete obtained according to ASTM C 172.
- F. Compressive Strength Tests: ASTM C 39/C 39M.
 - 1. Compression Test Specimens: ASTM C31/C 31M; cast and laboratory cure five 6"x12" standard cylinder specimens or seven 4"x8" standard cylinder specimens for each composite sample.
 - 2. Test one laboratory-cured specimen at 7 days and one set of two 6"x12" or three 4"x8" specimens at 28 days. Remaining cylinders shall be held in reserve.
 - 3. Obtain test samples for every 75 cu.yd. or less of each class of concrete placed each day.
 - 4. A compressive-strength test shall be the average compressive strength from all specimens obtained from same composite sample and tested at age indicated.
 - 5. Strength of each concrete mixture 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.
- G. Take two additional 6"x12" or three additional 4"x8" test cylinders during cold weather concreting, cured on job site under same conditions as concrete it represents. Test at 28 days.
- H. Perform one slump test, at point of discharge for each set of test cylinders taken, following procedures of ASTM C 143/C 143M.
- I. Perform air content test for each set of test cylinders taken, following procedures of ASTM C 231.
- J. Perform unit weight test of structural lightweight concrete for each set of test cylinders taken, following procedures of ASTM C 567.
- K. Test concrete temperature each hour when air temperature is 40 degrees F and below and when 80 degrees F and above, and for each set of test cylinders taken, following procedures of ASTM C 1064/C 1064M.

3.7 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to the Architect and Contractor within 24 hours of test.
 - 1. Testing and inspecting agency will make additional tests of concrete when test results indicate that slump, compressive strengths, or other requirements have not been met, as directed by the Architect.
 - 2. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by the Architect.
 - 3. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 - 4. Correct deficiencies that test reports and inspections indicate do not comply with specified requirements.
- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements. Repair or replace defective concrete, subject to the approval of the Architect.
- C. Do not patch, fill, touch-up, repair or replace exposed concrete except upon express direction of the Architect for each individual area.

END OF SECTION

SECTION 03 31 26 - SELF-CONSOLIDATING CONCRETE (SCC)**PART 1 - GENERAL****1.1 SUMMARY**

- A. General: Comply with Division 3 Section "Cast-in-Place Concrete" for standards, materials and procedures relating to cast-in-place concrete. Provisions in this section are in addition to those provisions.
- B. Extent of section includes materials and procedures for producing Self-Consolidating Concrete.

1.2 DEFINITIONS

- A. Self-Consolidating Concrete (SCC): A highly flowable, non-segregating concrete that can spread into place, fill the formwork, and encapsulate the reinforcement without any mechanical consolidation.
- B. Passing Ability: The ability of SCC to flow under its own weight (without vibration) and fill completely all spaces within intricate formwork, containing obstacles, such as reinforcement.
- C. J-Ring Test: Test used to determine the passing ability of SCC, or the degree to which the passage of concrete through the bars of the J-Ring apparatus is restricted.
- D. J-Ring Flow: The distance of lateral flow of concrete using the J-Ring in combination with a slump cone.
- E. Slump Flow: Test method used to measure the unconfined flow and stability of SCC using a slump cone (upright or inverted).
- F. Slump Flow Spread: The numerical value in inches of flow determined as the average diameter of the circular deposit of SCC at the conclusion of the slump flow test.
- G. T20 Value: Time (in seconds) the edge of the concrete mass takes to reach 20-inch diameter from the time the mold is first raised in the slump flow test.
- H. Stability: The ability of a concrete mixture to resist segregation of the paste from the aggregates.
- I. Visual Stability Index (VSI) Rating: An assessment of the homogeneity of concrete based on the visual inspection of the concrete sample at the end of the slump flow test.

1.3 SUBMITTALS

- A. In accordance with Division 1 Section "Submittal Procedures":
 - 1. Mixture proportions, including backup data.
 - 2. Certification: Manufacturer's certification stating that the products delivered meet or exceed Project Specifications.
 - 3. Product Data.
 - 4. Ready-mixed concrete delivery tickets.

1.4 QUALITY ASSURANCE

- A. References - Use the most current versions of the standards referenced.
- B. ASTM International (ASTM):
 - 1. C 1017- Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - 2. C 1611 - Standard Test method for Slump Flow of Self-Consolidating Concrete.

3. C 1621 - Standard Test Method for Passing Ability of Self-Consolidating Concrete by J-Ring.
 4. C 1712 - Standard Test Method for Rapid Assessment of Static Segregation Resistance of Self-Consolidating Concrete Using Penetration Test.
- C. American Concrete Institute (ACI)
1. ACI 301 Specifications for Structural Concrete.
- D. Testing and Inspection Agency Qualifications: Independent agency conforming to the requirements of ASTM E 329.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C 150, Type I/II.
- B. Fine and coarse aggregates: ASTM C 33.
- C. Water: Potable.
- D. Chemical Admixtures: Furnish from one manufacturer if possible.
1. Characteristics: Compatible with each other and free of intentionally-added chlorides.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Euclid Chemical Company (The)
 - b. GCP Applied Technologies
 - c. BASF Corporation Admixture Systems
 - d. Sika Corporation
 3. Air Entraining Admixture: ASTM C 260.
 4. Water-Reducing Admixture: ASTM C 494 Type A.
 5. Mid-Range Water-Reducing Admixture: ASTM C 494 Type A.
 6. High-Range Water-Reducing Admixture: ASTM C 494 Type F or ASTM C 1017 Type I.
 7. Accelerating Admixture: ASTM C 494 Type C or E.
 8. Retarding Admixture: ASTM C 494 Type B or D.
 9. Hydration Control Admixture: ASTM C 494 Type B or D.
 10. Workability-Retaining Admixture: ASTM C 494 Type S.
 - a. Retain concrete workability without affecting time of setting or early-age strength development.
 11. Viscosity-Modifying Admixture: ASTM C 494 Type S.
 12. Shrinkage-Reducing Admixture: ASTM C 494 Type S.
 13. Synthetic Microfibers: ASTM C 1116.
 14. Other admixtures as approved by the Architect/Engineer.
- E. Supplementary Cementitious Materials (SCM):
1. Make substitutions of supplementary cementitious materials for cement on the basis of mass.
 2. Fly Ash: ASTM C 618.
 3. Slag Cement: ASTM C 989
- F. Curing Materials: In accordance with Division 3 Section "Cast-in-Place Concrete".

2.2 CONCRETE MIXTURES

- A. Mixture Specifications:
1. Do not exceed a water-to-cementitious materials ratio of 0.45 by mass.

2. Supplementary Cementitious Materials: Do not exceed the percentages listed in the following table for the weight of SCM in concrete.

Material	Maximum percent of total cementitious materials by mass
Fly ash or other pozzolans	25
Slag cement	50
Silica Fume	10
Total of fly ash or other pozzolans and silica fume	35*
Total of fly ash or other pozzolans, slag cement and silica fume	50*

* Fly ash or other pozzolans and silica fume cannot constitute more than 25 and 10 percent, respectfully, of the total mass of cementitious materials

B. Slump Flow:

1. Measure slump flow in accordance with ASTM C 1611.
2. Typical ranges of slump flow are outlined in the following table.
3. Establish the design slump flow of the SCC mixture after consideration of the project requirements.
4. Maintain the slump flow of SCC used on the project within the design slump flow plus or minus 2 inches.

Type of Construction	Range of Slump Flow Values
	Inches
Architectural members	24-30
Wall, lightly reinforced	20-30
Column or wall, densely reinforced	24-30

- C. Visual Stability Index (VSI): VSI Rating (in accordance with ASTM C 1611 shall not exceed 1.
- D. J-Ring Flow: Limit the difference between slump flow and J-Ring flow (as measured by ASTM C 1621) to no more than 2 inches.
- E. Compressive strength: as listed on Contract Documents.
- F. Limit entrained air content to less than 3%.
- G. Maximum nominal size of coarse aggregate:
1. Not larger than 1/5 the narrowest dimension between sides of forms.
 2. Not larger than 3/4 of the minimum clear spacing between individual reinforcing bars.
 3. Limit the maximum size of aggregate to 3/4-inch.
- H. Furnish to the Architect/Engineer a mixture proportion for the SCC to be used.
1. Proportion mixture according to project specific criteria (Compressive Strength, Air Content, Slump Flow, VSI, J-Ring Value and Static Segregation Resistance).
 2. Use the same components in the trial batches as that to be used in the project including coarse and fine aggregates, inert non-cementitious fillers, water, source and type of

cement, supplementary cementitious materials and admixtures including any site-added admixtures intended to be used.

PART 3 - EXECUTION

3.1 FORMWORK

- A. General: Comply with Division 3 Section "Cast-in-Place Concrete" for formwork materials, procedures and tolerances.
- B. Take additional measures to seal the formwork to prevent leakage of cement paste or mortar.
- C. Design the formwork to withstand the fluid pressures of SCC.

3.2 BATCHING

- A. Batch materials in accordance with ASTM C 94. In addition to the use of a moisture probe, determine the moisture content of the aggregates once a day prior to batching in accordance with ASTM C 70 or ASTM C 566. Take aggregate samples as close as possible to the area where moisture probe is located. Use of microwave oven or hot plate to dry the aggregates is permitted in addition to using an oven.
- B. Batch the volume of concrete such that no spillage occurs during transport.

3.3 TRANSPORTING

- A. Transport the concrete in accordance with ASTM C 94.

3.4 DELIVERY AND PLACEMENT OF CONCRETE

- A. Provide batch ticket to the representative of the Owner's Testing and Inspection Agency at the time of concrete delivery. Contents of the batch ticket shall be as specified in ASTM C 94.
- B. Place self-consolidating concrete in exposed Architectural Concrete columns using the tremie method.
- C. Place self-consolidating concrete in exposed Architectural Concrete walls using either the tremie method or by pumping the concrete into the form from the bottom, using a gate valve. Locate gate valve on face of wall that will be concealed in final condition.
- D. Maintain at least a 2'-0" embedment of the tremie pipe into the fresh concrete as it is being placed. Withdraw tremie pipe once concrete has reached final elevation for that day's casting.

3.5 FIELD QUALITY CONTROL

- A. General:
 - 1. Provide adequate facilities for safe storage and proper curing of concrete test cylinders onsite for the first 24 hours or for additional time as may be required before transporting samples to the test lab.
 - 2. Provide concrete for testing of slump flow, air content, density (unit weight), temperature, and for making cylinders.
 - 3. Do not add water to the concrete at the job site.
 - 4. Do not make field addition of admixtures unless approved by the Architect/Engineer.
- B. Consult with the admixture manufacturer in developing quality control operations appropriate to the project.
- C. Perform field testing and inspection in accordance with ACI 301.
- D. Conduct concrete tests by an ACI Concrete Field Testing Technician Grade I, or equivalent, knowledgeable in testing self-consolidating concrete.

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- E. Conduct tests on the first batch of the day and for each 150 cubic yards or fraction thereof, for each concrete mixture placed in any one day.
- F. Testing agency responsibilities:
1. Inspect concrete placement.
 2. Sample the concrete in accordance with ASTM C 172.
 3. Test concrete slump flow in accordance with ASTM C 1611. Cone can either be used upright or inverted. Use same procedure throughout the project.
 4. Record the Visual Stability Index (VSI).
 5. Static Segregation Resistance - ASTM C 1712: Test when slump flow test is performed.
 6. Test passing ability in accordance with ASTM C 1621. Use cone in the same way as in slump flow test.
 7. Determine the air content of concrete sample for each strength test in accordance with ASTM C 231 or ASTM C 173, except that the concrete shall be filled in one lift and not consolidated. Light tamping of the sides of the air-meter is permitted.
 8. Determine the density (unit weight) of concrete sample for each strength test in accordance with ASTM C 138, except that the concrete shall be filled in one lift and not consolidated.
 9. Record the temperature of concrete for each strength test in accordance with ASTM C 1064.
 10. Cast concrete specimens for compressive strength test as follows:
 - a. Cast and cure at least three 6-inch by 12-inch cylinders or four 4-inch by 8-inch cylinders in accordance with ASTM C 31, except that the concrete shall be placed in one lift and not consolidated. However, light tapping of the sides of the cylinders with an open hand is permitted.
 11. Record the fresh concrete data for each set. Include the following on the datasheet:
 - a. Mixture number
 - b. Specified 28-day strength
 - c. Date and time of batching
 - d. Time of testing
 - e. Location of placement
 - f. Truck number
 - g. Ticket number
 - h. Slump flow, VSI, passing ability, air content, density (unit weight) and temperature of concrete
 - i. Ambient temperature
 - j. Names and quantities of admixtures added on site, and, name and title of the person who authorized the addition
 - k. Set number, if more than one set of cylinders are cast on a single day
 - l. Name of the testing agency
 - m. Name and signature of the inspector who conducted the test, and
 - n. Any additional observations or comments.
 12. Mark the cylinders and write the date of casting on each cylinder.
 13. Store and protect the cylinders at the job site immediately after casting in accordance with ASTM C 31.
 14. Transport the cylinders from job site to the laboratory in accordance with ASTM C 31 after the cylinders have attained acceptable strength.
 15. Cure the cylinders in the laboratory in accordance with ASTM C 31.
 16. Test cylinders for compressive strength in accordance with ASTM C 39.

- a. Test one cylinder at 7 days for information and at least two cylinders at 28 days for acceptance when testing 6-inch by 12-inch cylinders unless otherwise specified.
- b. Test one cylinder at 7 days for information and at least three cylinders at 28 days for acceptance when testing 4-inch by 8-inch cylinders unless otherwise specified.
17. Base strength value on the average of at least two 6-inch by 12-inch cylinders or three 4-inch by 8-inch cylinders tested at 28 days.
18. Include all the information in Item 10 above and compressive strength data on the test report, signed by the laboratory manager.
19. Strength of concrete shall be deemed satisfactory if both of the following requirements are met (ACI 318):
 - a. Every arithmetic average of any three consecutive compressive strength tests equals or exceeds the specified compressive strength, and
 - b. No compressive strength test falls below the specified compressive strength by more than 500 psi when the specified strength is 5000 psi or less; or by more than 10 percent of specified strength, when the specified strength is above 5000 psi.
20. If any strength test of laboratory-cured cylinders falls below the specified compressive strength by more than the values specified above, take remedial measures as recommended by the Architect/Engineer.

3.6 CONSOLIDATION

- A. Consolidation is typically not necessary for SCC. However, have internal vibrators available, as recommended in ACI 301, on site in case internal vibration is needed due to delays in placement or if the concrete has a lower than expected slump flow and has to be placed to prevent the formation of a cold joint.
- B. Obtain prior approval from the Architect/Engineer if minimal vibration (external or internal) is required for proper consolidation due to congested reinforcement or space restrictions.

3.7 CURING AND PROTECTION

- A. General: Comply with Division 3 Section "Cast-in-Place Concrete" for curing and protection of concrete.

END OF SECTION

SECTION 03 33 00 - ARCHITECTURAL CONCRETE**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section specifies cast-in-place architectural concrete including form facings, reinforcement accessories, concrete materials, concrete mixture design, placement procedures, and finishes.
- B. Extent of section is finish of exposed interior walls, including form liners.
- C. Comply with Division 3 Section "Cast-in-Place Concrete;" this Section specifies requirements in addition to those requirements.

1.2 DEFINITIONS

- A. Cast-in-Place Architectural Concrete: Formed concrete that is exposed to view on surfaces of completed structure or building and that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.
- B. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, and ground granulated blast-furnace slag; subject to compliance with requirements.
- C. Reveal: Projection of coarse aggregate from matrix or mortar after completion of exposure operations.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Formwork Shop Drawings: Show formwork construction including form-facing joints, rustications, construction and contraction joints, form joint-sealant details, form tie locations and patterns, inserts and embedments, cutouts, cleanout panels, and other items that visually affect cast-in-place architectural concrete.
- D. Placement Schedule: Submit concrete placement schedule before start of placement operations. Include locations of all joints including construction joints.
- E. Samples: For each of the following materials:
 - 1. Form-facing panel.
 - 2. Form ties.
 - 3. Form liners.
 - 4. Coarse- and fine-aggregate gradations.
 - 5. Semi-transparent vertical concrete stain.
- F. Qualification Data: For manufacturer.
- G. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
 - 1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- H. Material Certificates: For each of the following, signed by manufacturer:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Repair materials.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: Comply with Division 3 Section "Cast-in-Place Concrete."
- C. Source Limitations for Cast-in-Place Architectural Concrete: Obtain each color, size, type, and variety of concrete material and concrete mixture from one manufacturer with resources to provide cast-in-place architectural concrete of consistent quality in appearance and physical properties.
- D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5 and Section 6, "Architectural Concrete."
 2. ACI 303.1, "Specification for Cast-in-Place Architectural Concrete."
- E. Concrete Testing Service: Comply with Division 3 Section "Cast-in-Place Concrete."
- F. Field Sample Panels: Before casting architectural concrete, produce field sample panels to demonstrate the surfaces resulting from identified form liners; Owner will review field sample panels for quality and finish. Produce two full-scale panels, cast vertically, approximately 96 by 96 by 12 inches minimum. Each side of each panel will be produced with the form liners liners specified.
 1. Locate panels as indicated or, if not indicated, as directed by Architect.
 2. Demonstrate methods of curing, aggregate exposure, sealers, and coatings, as applicable.
 3. In presence of Architect, damage part of an exposed-face surface for each finish, color, and texture, and demonstrate materials and techniques proposed for repair of tie holes and surface blemishes to match adjacent undamaged surfaces.
 4. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
 5. Demolish and remove field sample panels when directed.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.
 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place architectural concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Cast-in-place architectural concrete subcontractor.
 - e. Architect.
 - f. Structural Engineer.
 - g. Owner's representative.

2. Review concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction joints, forms and form-removal limitations, reinforcement accessory installation, concrete repair procedures, and protection of cast-in-place architectural concrete.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. General: Comply with Division 03 Section "Cast-In-Place Concrete" for formwork and other form-facing material requirements.
- B. Form-Facing Panels for As-Cast Finishes: Steel, glass-fiber-reinforced plastic, or other approved nonabsorptive panel materials that will provide continuous, true, and smooth architectural concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- C. Form Liner:
 1. Pattern 1 Drawing Designation: Fitzgerald Formliners: Pattern 16920 Large Rustic Plank.
 2. Pattern 2 Drawing Designation: Fitzgerald Formliners: Pattern 15036A Fallen Leaves A.
- D. Chamfer Strips: Metal, rigid plastic, elastomeric rubber, or dressed wood, 3/4 by 3/4 inch 19 by 19 mm, minimum; nonstaining; in longest practicable lengths.
- E. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA 800, "Specification 810.1, Expanded Cellular Glazing Tape"; minimum 1/4 inch 6 mm thick.
- F. Form Joint Sealant: Elastomeric sealant complying with ASTM C 920, Type M or S, Grade NS that adheres to form joint substrates.
- G. Sealer: Penetrating, clear, polyurethane wood form sealer formulated to reduce absorption of bleed water and prevent migration of set-retarding chemicals from wood.
- H. Form-Release Agent: Commercially formulated colorless form-release agent that will not bond with, stain, or adversely affect architectural concrete surfaces and will not impair subsequent treatments of those surfaces; refer to finish specifications in this section.
 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- I. Surface Retarder: Chemical liquid set retarder, for application on form-facing materials, capable of temporarily delaying final hardening of newly placed concrete surface to depth of reveal specified.
- J. Form Ties: Factory-fabricated, internally disconnecting or removable ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal; coordinated for use with snap tie hole repair Snapplugs.
 1. 19 mm Furnish internally disconnecting ties that will leave no metal closer than 1-1/2 inches 38 mm from the architectural concrete surface.
 2. Snap Tie Hole Repair Snapplugs - Basis-of-Design: Dayton Superior; Snapplugs.
 - a. Product to provide watertight fill of holes created by tie cones.

2.2 STEEL REINFORCEMENT AND ACCESSORIES

- A. General: Comply with Division 03 Sections "Cast-In-Place Concrete" and "Self-Consolidating Concrete" for steel reinforcement and other requirements for reinforcement accessories.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire fabric in place; manufacture according to CRSI's "Manual of Standard Practice."
 1. Where legs of wire bar supports contact forms, use CRSI Class 1, gray, plastic-protected or CRSI Class 2, stainless-steel bar supports.

2.3 CONCRETE MATERIALS

- A. Comply with Division 3 Section “Cast-in-Place Concrete” for concrete materials requirements.
- B. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I or II, grey or white. Supplement with the following:
 - a. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- C. Normal-Weight Aggregates: Comply with Division 3 Sections “Cast-in-Place Concrete” and “Self-Consolidating Concrete.”
- D. Normal-Weight Fine Aggregate: Comply with Division 3 Sections “Cast-in-Place Concrete” and “Self-Consolidating Concrete.”
- E. Water: Comply with Division 3 Section “Cast-in-Place Concrete.”

2.4 ADMIXTURES

- A. Comply with Division 3 Sections “Cast-in-Place Concrete” and “Self-Consolidating Concrete.”

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Curing method must not be detrimental to application of semi-transparent vertical concrete stain and subsequent anti-graffiti coating.

2.6 REPAIR MATERIALS

- A. Comply with Division 3 Section “Cast-in-Place Concrete” for repair materials requirements.

2.7 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of cast-in-place architectural concrete proportioned on basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed design mixtures based on laboratory trial mixtures.
- B. Proportion concrete mixtures same as structural concrete; refer to Section 033000.
- C. Cementitious Materials: Comply with Division 03 Sections “Cast-in-Place Concrete” and “Self-Consolidating Concrete.”

2.8 CONCRETE MIXING

- A. Ready-Mixed Architectural Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.
 - 1. Clean equipment used to mix and deliver cast-in-place architectural concrete to prevent contamination from other concrete.
 - 2. 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.

2.9 FINISHING

- A. Semi-Transparent Vertical Concrete Penetrating Stain:
 - 1. Basis-of-Design: H&C/Sherwin-Williams Company; Product H&C Infusion Semi-Transparent Decorative 45.102000 Series.
 - a. Multiple applications of the semi-transparent dye will be applied to the vertical surface until the Architect and Owner are satisfied with the saturation and evenness of tone.
 - 1) Match accepted finish of field sample finish reviewed prior to start of this work.
 - b. Architect and Owner must review the results following application of the minimum second coat, to determine if additional coats are required for desired effect accepted through field sample panels; proceeding with graffiti resistant coating without Architect and Owner acceptance may cause rejection of the work.
 - 2. Color: Match Architect's sample or selection from Sherwin-Williams paint color line. Architect may select a different color for each wall area.
- B. Graffiti-Resistant Coating: Apply as topcoat to semi-transparent vertical concrete penetrating stain.
 - 1. Basis-of-Design: Sherwin-Williams Company; Product 2K WB Urethane - Anti-Graffiti Coating.
 - 2. Sheen: Satin.

PART 3 - EXECUTION

3.1 FORMWORK

- A. General: Comply with Division 03 Section "Cast-In-Place Concrete" for formwork, embedded items, and shoring and reshoring.
- B. Limit deflection of form-facing panels to not exceed ACI 303.1 requirements.
- C. In addition to ACI 303.1 limits on form-facing panel deflection, limit cast-in-place architectural concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch.
- D. Fabricate forms to result in cast-in-place architectural concrete that complies with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-in-place surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood rustications, keyways, reglets, recesses, and the like, for easy removal.
 - 1. Seal form joints and penetrations at form ties with form joint tape or form joint sealant to prevent cement paste leakage.
 - 2. 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. Coat contact surfaces of wood rustications and chamfer strips with sealer before placing reinforcement, anchoring devices, and embedded items.

3.2 REINFORCEMENT AND INSERTS

- A. General: Comply with Division 03 Section "Cast-In-Place Concrete" for fabricating and installing steel reinforcement. Securely fasten steel reinforcement and wire ties against shifting during concrete placement.

3.3 REMOVING AND REUSING FORMS

- A. Formwork for sides of beams, walls, columns, 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 for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
 - 1. Schedule form removal to maintain surface appearance that matches approved field sample panels.
 - 2. Cut off and grind glass-fiber-reinforced plastic form ties flush with surface of concrete.
- B. Clean and repair surfaces of forms to be reused in the Work. Do not use split, frayed, delaminated, or otherwise damaged form-facing material. Apply new form-release agent.
- C. 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 cast-in-place architectural concrete surfaces.

3.4 JOINTS

- A. Comply with Division 3 Section "Cast-in-Place Concrete" for concrete joint spacing requirements.
- B. Construction Joints: Install construction joints true to line with faces perpendicular to surface plane of cast-in-place architectural concrete 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.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches 38 mm into concrete. Align construction joint within rustications attached to form-facing material.
 - 3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Contraction Joints: Form weakened-plane contraction joints true to line with faces perpendicular to surface plane of cast-in-place architectural concrete so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

3.5 CONCRETE PLACEMENT

- A. Comply with Division 3 Section "Cast-in-Place Concrete" for concrete placement requirements.
- B. Use self-consolidating concrete for all vertical surfaces designated as "Architectural Concrete". Place concrete using either the "tremie" method or by pumping from the bottom of the form using a gate valve. Locate gate valve on a surface that will not be exposed to view in the finished wall.

3.6 FINISHES, GENERAL

- A. Architectural Concrete Finish: Match approved field sample, to satisfaction of Architect.

- 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.
 - 1. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.
- C. Maintain uniformity of special finishes over construction joints, unless otherwise indicated.

3.7 AS-CAST FORMED FINISHES

- A. Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Remove fins and other projections exceeding specified limits on formed-surface irregularities. Repair and patch tie holes and defects.
- B. Rubbed Finish: Apply the following to smooth-form-finished as-cast concrete where indicated:
 - 1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match surrounding concrete. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

3.8 CONCRETE PROTECTING AND CURING

- A. Comply with Division 3 Section "Cast-in-Place Concrete" for concrete protecting and curing requirements.
- B. Begin curing cast-in-place architectural concrete immediately after applying as-cast formed finishes to concrete. Cure according to ACI 308.1, by one or a combination of the following methods that will not mottle, discolor, or stain concrete:
 - 1. Moisture Curing: Keep exposed surfaces of cast-in-place architectural concrete continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period; use cover material and waterproof tape.

3.9 FINISHING

- A. Apply semi-transparent vertical concrete stain and graffiti resistant coating according to manufacturer's instructions.
- B. Architect and Owner must review and accept the results following application of the second coat; proceeding with graffiti resistant coating without Architect and Owner acceptance may cause rejection of the work.

3.10 FIELD QUALITY CONTROL

- A. General: Comply with Division 03 Section "Cast-In-Place Concrete" for field quality-control requirements.

3.11 REPAIRS, PROTECTION, AND CLEANING

- A. Repair and cure damaged finished surfaces of cast-in-place architectural concrete when approved by Architect. Match repairs to color, texture, and uniformity of surrounding surfaces and to repairs on approved field sample.
 - 1. Remove and replace cast-in-place architectural concrete that cannot be repaired and cured to Architect's approval.
- B. Protect corners, edges, and surfaces of cast-in-place architectural concrete from damage; use guards and barricades.
- C. Protect cast-in-place architectural concrete from staining, laitance, and contamination during remainder of construction period.
- D. Clean cast-in-place architectural concrete surfaces after finish treatment to remove stains, markings, dust, and debris.
- E. Wash and rinse surfaces according to concrete finish applicator's written recommendations. Protect other Work from staining or damage due to cleaning operations.
 - 1. Do not use cleaning materials or processes that could change the appearance of cast-in-place architectural concrete finishes.

END OF SECTION

SECTION 03 35 13 - HIGH-TOLERANCE CONCRETE FLOOR FINISHING**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Finishing slabs on grade and monolithic floor slabs.
- B. Surface treatment with concrete hardener and sealer.

1.2 REFERENCE STANDARDS

- A. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.
- B. ACI 302.1R – Guide for Concrete Floor and Slab Construction; American Concrete Institute.
- C. ASTM E 1155 – Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness.

1.3 SUBMITTALS

- A. Section 01 30 00 – Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on concrete hardener and sealer, including information on compatibility of different products and limitations.
- C. Submit floor surface flatness and levelness measurements to determine compliance with specified tolerances.
- D. Maintenance Data: Provide data on maintenance renewal of applied coatings.
- E. LEED Submittal: Provide documentation of VOC content in g/L for primers, sealers and floor coatings applied within the building waterproofing envelope.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
 - 1. Maintain one copy on project site.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.6 PROJECT CONDITIONS

- A. Coordinate the work with concrete floor placement and concrete floor curing.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperature of 50 degrees F minimum.
- B. Provide ventilation sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

PART 2 - PRODUCTS**2.1 COMPOUNDS – HARDENERS AND SEALERS**

- A. Chemical Hardener: Clear, chemically reactive, waterborne solution of inorganic silicate materials and proprietary components, odorless, colorless, that penetrates, hardens, and densifies concrete surfaces.
 - 1. Provide for exterior slabs and interior slabs not receiving a subsequent finish; regardless of Finish Schedule indicating concrete hardener or not.
 - 2. VOC Content: Not to exceed 200 g/L.
 - 3. Acceptable Products:

- a. Ashford Formula, Concrete Chemical Company, Inc.
- b. Seal Hard, L & M Concrete Chemicals, Inc.
- c. Euco Diamond Hard, Euclid Chemical Company.

PART 3 - EXECUTION

3.1 FLOOR FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1R.
- B. Steel trowel surfaces that will receive carpeting, resilient floors, seamless flooring, thin set terrazzo or thin set ceramic tile.
- C. Steel trowel surfaces that are scheduled to be exposed.
- D. Fine-broomed finish for exterior slabs.

3.2 FLOOR SURFACE TREATMENT

- A. Apply hardener to floor surfaces in accordance with manufacturer's instructions.

3.3 TOLERANCES

- A. An independent testing agency, as specified in Section 14 00 00, will inspect finished slabs for flatness.
- B. Measure for F(F) and F(L) tolerances for floors in accordance with ASTM E 1155, within 48 hours after slab installation.
- C. Finish concrete to achieve the following tolerances:
 1. Slabs to be Covered with Thin Floor Coverings (i.e., resilient flooring). Specified overall values of flatness F(F) 35 and of levelness F(L) 25; with minimum local values of flatness, F(F) 24 and of levelness F(L) 17.
 2. Slabs to be Covered with Wood Athletic Flooring: Specified overall values of flatness F(F) 35 and of levelness F(L) 25; with minimum local values of flatness, F(F) 24 and of levelness F(L) 17.
 3. Slabs to be Covered with Carpet and Other Slabs: Specified overall values of flatness F(F) 25 and of levelness F(L) 20; with minimum local values of flatness, F(F) 17 and of levelness F(L) 15.
 4. The F(L) values listed above are not applicable to elevated slabs on deck. Only F(F) values apply to elevated slabs.
- D. Correct the slab surface if tolerances are less than specified.
- E. Correct defects by grinding or by removal and replacement of defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

END OF SECTION

SECTION 03 35 19 - GROUND AND POLISHED CONCRETE**PART 1 - GENERAL****1.1 SUMMARY**

- A. Concrete processing/polishing using a multi-step wet/dry process of the concrete surface through means of a mechanical process that uses an abrasive medium where each step is refined to its purest possible form on a microscopic level from one progressively finer abrasive to the next until the desired level of finish or polish is achieved. The process includes the use of potassium silicate sealer, hardener, and densifier floor finish, scavenger for unreacted silicate removal and non-film forming stain protection.
 - 1. Work of this Section applies to designated concrete floor areas.
- B. Coordinate with concrete trade for Work specified in other Division 3 sections.
- C. This section includes the following.
 - 1. Sealer and hardener, grind and polish concrete to specified finish level.
 - 2. Impregnating Micro Filming Stain Inhibitor.
 - 3. High performance surface protector.

1.2 SUBMITTALS

- A. Product Data:
 - 1. Submit special concrete finishes manufacturer's specifications, test data and other data required for each type of manufactured material and product indicated; include high performance surface protector data.
 - 2. Submit special concrete finishes describing products to be provided, giving manufacturer's name, product name, and product line number for the specified material proposed to be provided under this section.
 - 3. Submit special concrete finishes manufacturer's recommended installation procedures; which when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
 - 4. Submit special concrete finishes technical data sheet giving descriptive data, curing time, and application requirements.
 - a. Provide material analysis and generic type.
 - b. Submit special concrete finishes manufacturer's Material Safety Data Sheet (MSDS) and other safety requirements.
 - c. Submit manufacturer and model of all abrasives.
 - d. Submit manufacturer and model of equipment that mechanically rotate abrasives.
 - e. Submit Impregnating Micro Filming Stain Inhibitor.
 - f. Follow all special concrete finishes published manufacturer's installation instructions.
- B. LEED Submittals:
 - 1. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
- C. Test Reports:
 - 1. Provide certified test reports, prepared by an independent testing laboratory, confirming compliance with specified coefficient of friction performance criteria.
- D. Installer's Job References:

1. Submit a listing of five similar projects that are more than one year old. Provide physical address and contact information for each. Include the manufacturer and product-make-model of the hardner/densifier used, equipment used to drive the abrasives and abrasives steps completed.
 2. Provide documentation that installer's supervisor is certified by manufacturer and completed manufacturer's training program.
- E. Maintenance:
1. Include manufacturer's instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.
 2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Experience: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce specified work.
 2. Supervision: Maintain competent supervisor who is at Project during all times specified work is in progress, and is currently certified and trained by system manufacturer.
 3. Use adequate number of skilled work people who are trained and experienced in the work involving concrete polishing and new placement concrete surface texturing.
 4. Manufacturer Qualification: Approved by manufacturer to apply or use:
 - a. Liquid applied products.
 - b. Equipment.
- B. Walkway Auditor: Certified by NFSI to test polished floors for static coefficient of friction according to NFSI 101-A.
- C. Static Coefficient of Friction: Achieve not less than 0.5 for level floor surfaces as determined by quality control testing according to NFSI 101-A.
- D. Manufacturer's Certification and Representation:
1. Provide letter of certification from concrete finish manufacturer or specialized applicator stating that installer is certified applicator of special concrete finishes, specified herein, and is familiar with proper procedures and installation requirements required by the manufacturer.
 2. During the concrete finishing process, a representative of the finishing system manufacturer must be on site while Work is being performed by installer; this requirement is in addition to manufacturer certified and trained installer supervisor.
- E. Mockups:
1. Prepare mockup areas to be used by the Owner and Architect as a reference and general guide as to the appearance of the finished product.
 - a. Form, reinforce, and cast concrete slab for 100 foot square field mock-up; Owner may require 4 mockups to accept expected results.
 - b. Mockup areas to be prepared as indicated in Division 3 for areas receiving the Work of this Section including Ff 35/FI 30; concrete shall be same mix design as scheduled for Project.
 - c. Perform floor treatment work as scheduled for Project using same personnel as will perform Work for Project.
 - d. Purpose of mockups is for selecting one color to be used throughout and two sheens; Work of this section in entry level space to be higher sheen than other areas.

- e. Conduct specified coefficient of friction tests on each mockup.
 - f. Mock-up shall be produced using specifications specified for areas to receive concrete processing or polishing.
 - g. Mock-up shall be placed and finished by the same concrete flat work contractor responsible for pouring and placing permanent flatwork using the same finishing procedures as specified in Section 033300 "Cast-In-Place Concrete".
 - h. Mock-up shall be used to show Level of cut / aggregate exposure based on the following criteria:
 - 1) Class C Medium Aggregate; medium aggregate exposure with little or no large aggregate exposure at random locations.
 - i. Mock-up shall be used to show level of sheen when the concrete surfaced is mechanically processed as specified in Part 3 of this Section:
 - 1) Level 2 sheen (low to medium gloss) as determined by gloss reading of 40-50.
 - j. Mock-up shall be used to show clarity the cut surface, color, natural variations.
 - k. Concrete processing to be performed with the same abrasives, equipment, hardeners/densifiers to be used in processing permanent flatwork.
 - l. If determined mockups do not meet architect's specifications General Contractor will remove and replace mockups until architect approval is given.
 - m. General Contractor to notify Owner and Architect 14 days prior to mockup construction and finishing.
 - n. General Contractor is to maintain mockups during construction and will be used as a general reference to the finished product.
 - o. Mockups may be incorporated into finished work.
 - p. General Contractor will be responsible for removal and disposal of mockups.
- F. Pre-Installation of Concrete Conference: Prior to placing concrete for areas scheduled for polishing, conduct conference at Project to comply with requirements of applicable Division 01 Sections.
- 1. Required Attendees:
 - a. Owner.
 - b. Architect.
 - c. Contractor, including supervisor.
 - d. Concrete producer.
 - e. Concrete finisher, including supervisor.
 - f. Concrete treatment contractor, including supervisor.
 - g. Technical representative of liquid applied product manufacturers.
 - h. Walkway auditor.
 - i. Minimum Agenda: Sub Contractor shall demonstrate understanding of work required by reviewing and discussing procedures for, but not limited to, following:
 - 1) Tour field mock-up and representative areas of required work, discuss and evaluate for compliance with Contract Documents, including substrate conditions, surface preparations, sequence of procedures, and other preparatory work performed by other installers.
 - 2) Review Contract Document requirements.
 - 3) Review approved submittals and field mock-up.
 - 4) Review concrete placement and finishing procedures, including, but not limited to:
 - 5) Applicable Division 03 Section on cast-in-place concrete:
 - (a) Form Construction.
 - (b) Edge Finishing to ensure a consistent finish from edge to edge.

- (c) Specific mix design.
 - (d) Specified curing methods/procedures.
 - (e) Projected 3, 10, and 28 day compression strength test related to specified aggregates exposure for finished floor and project phasing.
 - (f) Protection of concrete substrate during construction.
 - (g) Project phasing and scheduling for each step of operations including, but not limited to:
 - (1) Quality of qualified personnel committed to project.
 - (2) Quality and size of grinders committed to project.
 - (3) Type and size of auto scrubbers for cleaning.
 - (4) Quality and size of all equipment committed to project.
 - (5) Proper disposal of concrete slurry and/or concrete dust.
 - (6) Details of each step of operations.
 - (7) Application of liquid applied products.
 - (8) Protecting concrete floors after work is complete.
 - j. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.
- G. Protection: No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential.
- 1. All hydraulic powered equipment must be diapered to avoid staining of the concrete.
 - 2. No trade will park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.
 - 3. No pipe cutting machine will be used on the inside floor slab.
 - 4. Steel will not be placed on interior slab to avoid rust staining.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages and containers, with seal's unbroken, bearing manufacturer labels indicating brand name and directions for storage, mixing with other components, and application.
- B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.
- C. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.
- D. Use one source for cement, aggregates and pozzolans throughout the job. Monitor and control incoming material consistency. Do not use calcium chloride-based admixtures. Non-chloride admixtures may be used.
- E. Wash out all drums before loading. Keep slumps consistent. Minimize driver-added water.
- F. Store products in unopened packaging until ready for installation with packages clearly labeled with the manufacturer's name, type.
- G. Store in a cool place, preferably under cover, at temperatures between 40 and 90 degrees F (4 and 32 degrees).
- H. Protect from freezing.
- I. Environmental limitations:
 - 1. Comply with manufacturers written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.

2. Store and dispose of solvent-based materials in accordance with requirements of local authorities having jurisdiction.
- J. Close areas to traffic during floor application and after application, for time period recommended in writing by manufacturer.

1.5 PROJECT CONDITIONS

- A. Contractor is to maintain temperature, humidity, and ventilation within limits recommended by manufacturer of any products used for application.
- B. Contractor is to have job site lighting operational and provide sufficient light for the process.
- C. Contractor is to maintain ambient temperature of 50 degrees minimum and 80 degrees maximum to allow for proper curing of hardeners or densifiers.
- D. Contractor is to provide water within 50 feet of work area one day before work is scheduled to start.
- E. Contractor is to provide electrician to hook up power requirements for Installer one day before work is scheduled to start.
- F. Contractor is to provide power within 50 feet of work site and able to handle the concrete processing Installer's power requirements one day before work is scheduled to start.
- G. Floor to be broom swept before work begins.
- H. Removing all debris from floor joints before Installer begins work.
- I. No other trades allowed in area being work on by Installer and area is to be free and clear of anything that would prevent work from progressing in a timely manner.
- J. In the event solvent based stains are used anything that produces sparks or flames must be turned off.
- K. Smoking is not permitted.
- L. Process is to be performed before framing or after framing but before drywall or after framing and drywall but before door jambs, paint and base molding.
- M. Damage and Stain Prevention: Take precautions to prevent damage and staining of concrete surfaces to be polished.
 1. Prohibit use of markers, spray paint, soapstone and detrimental colors of chalk.
 2. Prohibit application of curing compounds.
 3. Prohibit vehicle parking over concrete surfaces.
 4. Prohibit pipe cutting operations over concrete surfaces to be polished.
 5. Prohibit storage of any items over concrete surfaces to be polished for not less than 28 days after concrete placement.
 6. Prohibit ferrous metals storage over concrete surfaces to be polished.
 7. Protect from petroleum, oil, hydraulic fluid, or other liquid dripping from equipment working over concrete surfaces to be polished.
 8. Protect from acids and acidic detergents contacting concrete surfaces to be polished.
 9. Protect from painting activities over concrete surfaces to be polished.

1.6 WARRANTY

- A. Provide 20 year manufacturer's material warranty commencing at date of building substantial completion. Manufacturer shall warrant to the Owner that polished surface will remain water repellent, dustproof, hardened, abrasion resistant and food stain resistant.

PART 2 - PRODUCTS

2.1 FLAT WORK REQUIREMENTS

- A. Contractor is required to confirm slab requirements as outlined here and in Division 3 Section Cast-in-Place Concrete through the use of a third party testing company.
 - 1. Concrete must have a minimum Floor Flatness rating of 40-50.
 - 2. Concrete must have a minimum Floor Levelness rating of 40-50.
- B. Moist cure with blankets; do not employ a topical compound; subcontractor performing polishing to confirm compliance with this requirement.
- C. Concrete must be cured for a minimum of 45 days.
- D. Lightly troweled finish using plastic trowel blades, not burned and no hand finishing.
- E. If fine aggregate finish with minimum aggregate has been specified confirm concrete was vibrated and was thoroughly floated and tamped.
- F. If flat work preparation is the responsibility of another subcontractor, immediately notify Architect of unsatisfactory condition. Do not proceed until surface is in compliance with specified and installers recommendations or unless otherwise in writing agreed upon between Installer and Architect.
- G. Identify and rectify any conditions and/or concerns that will affect final finish. Do not begin installation until substrates have been properly prepared unless otherwise in writing agreed upon between Installer and Architect.
- H. Confirm all conditions as outlined in Part 1 "Project Conditions" have been met.

2.2 CONCRETE MIX DESIGN

- A. 4 to 5 inch slump is recommended. Maintain the same water/cement ratio throughout the job. Required higher slumps should be achieved by using water reducing or plasticizing admixtures and not by adding water because this will adversely affect the color.
- B. Minimum concrete $f'c = 3,500$ PSI at 28 days.
- C. Only OPC blend concrete permitted; use of fly ash or slag to be avoided due to inconsistency in accepting chemical hardeners used in the process.
- D. Refer to Section 033000, "Cast-in-Place Concrete" for additional requirements.

2.3 MATERIALS AND MANUFACTURERS

- A. Hardener/Sealer Agent:
 - 1. Products:
 - a. Retro-Plate 99, manufactured by Advanced Floor Products, Inc.
 - b. Seal Hard by L & M Construction Chemicals, Inc.
 - c. Euco Diamond Hard by EUCLID Chemical.
 - d. Liqui-Hard by W. R. Meadows, Inc.
 - e. Performance Criteria:
 - 1) Abrasion Resistance: ASTM C779 - Up to 400% increase in abrasion resistance.
 - 2) Impact Strength: ASTM C805 - 21% increase impact strength.
 - 3) Ultra Violet Light and Water Spray: ASTM G23-81 - No adverse effect to ultra violet and water spray.
 - f. Co-efficient of Friction: ASTM 1028 - all levels of finish (up to 1500 grit) exceed OSHA and ADA recommendations.
 - 1) Reflectivity: 30% increase in reflectivity.
- B. Impregnating Micro Filming Stain Inhibitor:

1. Products:
 - a. Retro Guard manufactured by Advanced Floor Products, Inc.
 - b. Scofield Formula One Guard-S by L.M. Scofield Company.
 - c. Prosoco LS Guard by Prosoco.
 - d. The purpose of stain inhibitor is to provide enhanced stain resistance during the cure.
- C. Joint Filler:
 1. Crete Fill Pro by Curecrete Distribution.
 2. Spal Pro RS 65 by Metzger McGuire.
 3. PE75 Polyurea Joint and Crack Filler by Hi Tech.
- D. Abrasives:
 1. Abrasives are to be tried and proven in a field setting.
 2. If requested the manufacturer must supply 10 references of Installers currently using their abrasives and pictures of jobs completed by those Installers.
 3. Hardness of abrasive must be matched with hardness of concrete.
 4. All resin abrasives must be from the same manufacturer, make and model.
- E. Equipment:
 1. Grinding, honing and polishing equipment manufacturer is to be one having tried and proven equipment in a field setting.
 2. If requested the manufacturer must supply 10 references of Installers currently using their equipment and pictures of jobs completed by those Installers.
- F. Auto Scrubber:
 1. Manufacturer of the auto scrubber shall be one that is tried and proven equipment in a field setting.
 2. If requested the manufacturer must supply 10 references of Installers currently using their equipment.
 3. Unit must have adequate downward head pressure to thoroughly clean floor.
- G. Vacuum System:
 1. Dry Dust Vacuum system manufacturer is to be one having tried and proven equipment in a field setting.
 2. If requested the manufacturer must supply 10 references of Installers currently using their equipment.
 3. System must capture dust and debris to meet OSHA air quality standards.
- H. Joint Filler:
 1. Joint Filler must be VOC compliant and have third party data showing performance results whose product is tried and proven in a field setting.
 2. If requested the manufacturer must supply 10 references of Installers currently using their joint filler and pictures of jobs completed by those Installers that are greater than three years old.
- I. Crack Repair Material:
 1. Crack Repair Material must be VOC compliant and have third party data showing performance results whose product is tried and proven in a field setting.
 2. If requested the manufacturer must supply 10 references of Installers currently using crack repair material and pictures of jobs completed by those Installers that are greater than one year old.
- J. Patching Material:
 1. Patching Material must be VOC compliant and have third party data showing performance results whose product is tried and proven in a field setting.

2. If requested the manufacturer must supply 10 references of Installers currently using their patching material and pictures of jobs completed by those Installers that are greater than one year old.

K. Cement Binder Repair Material:

1. Cement Binder Repair material must be VOC compliant whose product is tried and proven in a field setting.
2. If requested the manufacturer must supply 10 references of Installers currently using their equipment and pictures of jobs completed by those Installers that are greater than two years old.

2.4 RELATED MATERIALS

- A. Neutralizing Agent: Tri-sodium Phosphate.
- B. Water: Potable.
- C. Protective Cover: Skudoo Heavy Commercial Matt or Ram Board.

2.5 HIGH PERFORMANCE SURFACE PROTECTOR

- A. Basis-of-Design: 3M Stone Floor Protector.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Refer to Part 2 subsection, Flat Work Requirements.

3.2 MATERIAL APPLICATION - GENERAL

- A. Start any of the floor finish applications in presence of manufacturer's technical representative.
- B. Impregnating Micro Filming Stain Inhibitor:
 1. Apply 2 light applications of Retro Guard in accordance with the manufacturers printed instructions.
 2. The floor should be completely dry prior to applying the sealer. In areas that are still wet you will not receive the same penetration, and subsequently, lower or no protection from the sealer, and you may promote spotting or a blotchiness on the surface.

3.3 INSTALLATION POLISHING PROCESS

- A. The process is to be performed wet with all grits below 150 resin and wet or dry for the balance of the processes unless the Installer provides vacuums designed specifically for dry polishing concrete. If dry grinding with metal abrasives, Installer must maintain air quality that meets or exceeds OSHA air quality standards.
- B. The Installer is to determine what grit to start the process to reach specified aggregate exposure.
 1. Class C Medium Aggregate; medium aggregate exposure with little or no large aggregate exposure at random locations.
- C. Final grit performed per finish specifications to achieve the following using the mechanically process as specified in this section.
 1. Level 2 sheen (low to medium gloss) as determined by gloss reading of 40-50.
- D. The number of abrasives under the equipment will be dictated by the specified head pressure needed for proper abrasion to occur by the abrasive manufacturer.
- E. A minimum of two passes in different direction per grit is required.
- F. At no time are any consecutive grits to be skipped following the starting grit abrasive.

- G. The Installer will drop back one grit resin abrasive from the last metal grit abrasive used. A separation in grit designation size must be a minimum of 50 when transitioning from metal to resin.
- H. The Installer will refine the concrete surface with each grit abrasive to its maximum potential before moving on to the next consecutively finer grit.
 - 1. The Installer must refine the concrete surface further than replacing the scratch pattern from the previous grit abrasive with the next grit abrasive.
- I. Each wet grit after 100 metal must be refined until the slurry becomes translucent in the middle and clear around the edges.
- J. Each dry grit abrasive after 100 resin must be refined until the abrasives flowingly move across the surface.
- K. An auto scrubber must be used to clean the floor in between each grit until any particulate grit larger in size than what the next grit cut will produce has been removed from the floor before continuing to the next progressively finer grit.
- L. Process:
 - 1. Removal of Pre-existing Materials:
 - a. Remove coatings, sealers, curing agents, bond breakers and glue using an abrasive designed for the particular removal application and one that will cause the least amount of damage to the surface.
 - b. Be mindful of the specified aggregate exposure.
 - c. Grinding:
 - 1) Aggregate Exposure: The Installer is to determine what grit to start the process to reach specified aggregate exposure.
 - 2) Work to and stay within specified layer of aggregate.
 - 3) Metal abrasive grinding shall not go any higher than 220 unless special circumstances present themselves and approved by Architect.
 - 4) Initial grind should clean the concrete surface, removing all coatings, dirt, oil and laitance. If grinding does not remove oil spots, treat oil spots with emulsifier and oil absorber materials. Detail scrub with high pH detergent.
 - (a) Double scrub floor with automatic scrubber capable minimum of 80 to 120 pounds of head pressure, equipped with black stripping pads. Use proper dilution of high pH detergent. Scrub floor once without squeegee or vacuum. On second pass, remove water solution.
 - (b) Using automatic scrubber rinse surface removing all traces of soap residue.
 - (c) Repeat any steps as necessary to prepare for polishing.
 - d. Harden / Densify:
 - 1) Application of a densifier will be dictated by the concrete but will not be applied any later than 150 grit resin unless special circumstances present themselves and approved by the Architect.
 - 2) Rate: 200 sf/gallon.
 - 3) Densifier shall be applied according to manufacturer's directions.
 - e. Honing:
 - 1) Start Honing with 100/120 grit resin.
 - 2) Follow with 100/120 grit resin with 200/220 grit resin.
 - 3) Follow with 200/220 grit resin with 400 grit resin.
 - f. Polishing:
 - 1) Clarity of reflection and durability: End processing at the specified level of clarity of reflection.

- 2) Polish with 800 grit resin.
- g. Inspection:
 - 1) Surface must be free from any random scratch patterns.
 - 2) All edges must be uniformly cut and processed when compared to the rest of the floor.
 - 3) Corrections to be made prior to application of Impregnating Micro Filming Stain Inhibitor.
 - 4) Perform necessary gloss readings to determine specified gloss level prior to application of stain repellent.
- h. Impregnating Micro Filming Stain Inhibitor:
 - 1) Thoroughly clean floor removing all dust and debris.
 - 2) Apply according to manufacturer's directions.
 - 3) Do not over apply product that creates an excessive topical application.
 - 4) Perform final buff with burnisher operating at no less than 1500 rpm and pad.
 - 5) FIELD QUALITY CONTROL
 - 6) Inspect completed polished concrete floor system with Owner, Contractor, Architect, and Installer.
2. Review procedures with Owner and Architect to correct unacceptable areas of completed polished concrete floor system.
3. Testing: Test the following from completed polished concrete floor system:
 - a. Dynamic Coefficient of Friction, ANSI/NFSI B101.3:
 - b. Walkway Surfaces: Minimum 0.5.
 - c. Report test results in writing to Owner, Contractor, and Architect within 24 hours after tests.

3.4 WORKMANSHIP AND CLEANING

- A. The premises shall be kept clean and free of debris at all times.
- B. Remove spatter from adjoining surfaces, as necessary.
- C. Repair damages to surface caused by cleaning operations.
- D. Remove debris from jobsite.
 1. Dispose of materials in separate, closed containers in accordance with local regulations.

3.5 PROTECTION

- A. Protect finished work until fully cured in accordance with manufacturer's recommendations.
- B. Obtain visual observation of architect and Owner prior to covering floor with protection materials.
- C. Protect completed polished concrete floor system from damage until Substantial Completion.
 1. Do not allow vehicle and pedestrian traffic on unprotected floor.
 2. Do not allow construction materials, equipment, and tools on unprotected floor.
- D. Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings, and other surface contaminants which could adversely affect completed polished concrete floor system.
- E. Repair damaged areas of completed polished concrete floor system to satisfaction of Architect.
- F. Prohibit caustic chemicals and materials, acids and acidic detergents to come in contact with slab.

3.6 HIGH PERFORMANCE SURFACE PROTECTOR

- A. After removal of protective cover at Substantial Completion, apply and finish high performance surface protector according to manufacturer's instruction to comply with coefficient of friction requirements.
- B. Polishing subcontractor to review and educate facility maintenance staff on proper maintenance program and schedule.

END OF SECTION

SECTION 03 39 00 - CONCRETE CURING**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Initial and final curing of horizontal and vertical concrete surfaces.

1.2 REFERENCE STANDARDS

- A. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute.
- B. ACI 302.1R – Guide for Concrete Floor and Slab Construction; American Concrete Institute.
- C. ACI 305R – Hot Weather Concreting; American Concrete Institute.
- D. ACI 306R – Cold Weather Concreting; American Concrete Institute.
- E. ACI 308R – Guide to Curing Concrete; American Concrete Institute.
- F. ASTM C 171 – Standard Specification for Sheet Materials for Curing Concrete.
- G. ASTM C 309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- H. ASTM D 2103 – Standard Specification for Polyethylene Film and Sheeting.

1.3 SUBMITTALS

- A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on curing compounds, moisture-retaining sheet, and polyethylene film, including compatibility of different products and limitations.
- C. LEED Submittal: Provide documentation of VOC content in g/L for concrete curing compound.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301 and ACI 302.1R.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Membrane Curing Compound: ASTM C 309 Type 1 – Clear or translucent, Class B.
 - 1. VOC Content not to exceed 350 g/L.
- C. Moisture-Retaining Sheet: ASTM C 171.
 - 1. Curing paper, regular.
 - 2. Polyethylene film, clear, minimum nominal thickness of 0.0040 in.
 - 3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd., 40 inches wide.
- D. Polyethylene Film: ASTM D 2103, 4 mil thick, clear.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify that substrate surfaces are ready to be cured.

3.2 EXECUTION – HORIZONTAL SURFACES

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306R for cold-weather protection and ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft./h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure floor surfaces in accordance with ACI 308.
- D. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges; maintain in place for not less than 4 days.
- E. Absorptive Moisture-Retaining Sheet: Saturate burlap-polyethylene and place burlap side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.
- F. Membrane Curing Compound: Apply curing compound in accordance with manufacturer's instructions in one coat.

3.3 EXECUTION – VERTICAL SURFACES

- A. Cure surfaces in accordance with ACI 308.
- B. Membrane Curing Compound: Apply compound in accordance with manufacturer's instructions in one coat.

3.4 PROTECTION

- A. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 03 48 13 - PRECAST CONCRETE STAIR TREADS AND AMENITIES**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes precast concrete treads for stairs and landings; setting material, grouts, sealants and caulks.
- B. Locations: Stair 1 Lobby Stair and Common Stairs D1.

1.2 SUBMITTALS

- A. Shop Drawings: Submit shop drawings of all precast concrete items showing detail sections and profile for all precast items. Details shall show all reinforcing and special hardware for fastening.
 - 1. Must be prepared qualified engineer engaged by the manufacturer; structural analysis data and shop drawings to be signed and sealed by professional engineer licensed in the State of Maryland.
- B. Samples: Submit three samples 6 x 12 inch size of each color selected.
- C. Certification: Suppliers shall furnish certification attesting that materials meet specification requirements.
- D. LEED Submittals:
 - 1. Low Emitting Materials / Adhesives and Sealants: Submit Product Data for each interior adhesive and sealant product used, with VOC levels highlighted.
 - 2. Regional Materials: Submit invoices and documentation showing manufacturing locations and origins of materials for products manufactured within 500 miles of the building site.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design stair treads and landings as structural components of stair system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance of Stairs: Stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
 - 1. Uniform Load: 100 lbf/sq. ft.
 - 2. Concentrated Load: 300 lbf (1.33 kN) applied on an area of 4 sq. in.
 - 3. Uniform and concentrated loads need not be assumed to act concurrently.
 - 4. Limit deflection of treads, platforms, and framing members to L/240 typical; L/360 for precast or stone treads; or 1/4 inch (6.4 mm), whichever is less.
 - 5. Forces applied by railing system anchored to tread.
 - 6. Seismic Performance: Stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- C. Design and fabricate precast concrete components with the following minimum characteristics:
 - 1. Compressive Strength: 5000 psi.
 - 2. Air Content: 6-8 percent.
 - 3. Water-Cement Ratio: 45:1.

1.4 QUALITY ASSURANCE

- A. PCI Standards: Comply with specified provisions and recommendations of the Precast/Prestressed Concrete Institute (PCI).

- B. ACI Manual of Concrete Practice: Comply with specified provisions and recommendations of the American Concrete Institute (ACI).
- C. Manufacturer's Instructions: In addition to specified requirements, comply with precast concrete manufacturer's instructions and recommendations for substrate preparation, materials storage, mixing and application, finishing and curing.
- D. Qualifications: Precast Concrete Manufacturer and Trade Contractor must have a minimum of 5 years of successful experience on projects of similar magnitude and complexity to that indicated project.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Packaging and Shipping: Precast concrete to be palletized and shrink wrapped, delivered in original unopened packaging with legible manufacturer identification, including size, piece number, quantities, manufacturer date and inspector initials.
- B. Storage and Protection: Precast concrete to be stored indoors, sheltered from moisture in original packaging. Protect from damage by other trades.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C-150 Specifications for Portland Cement.
- B. Aggregates: All aggregates to meet ASTM C-33 specifications; cleaned and properly graded to size. Aggregates shall be blended to meet individual project requirements.
- C. Coloring: Pigments used shall be inorganic, resistant to alkalinity and used per manufacturer's recommendations.
 - 1. Design Intent: Aesthetic accepted by Architect as similar to polished concrete finish on floors.
- D. Reinforcement and Hardware:
 - 1. To conform with ACI and Manufacturer's design.
 - 2. Reinforce precast with deformed rods or wire mesh or both as recommended by precast concrete manufacturer.
- E. Abrasive Inserts: Silicon carbide and black epoxy; three lines.
- F. Caulks and Sealants:
 - 1. Low VOC type; Urethane or Polyurethane Sealant.
 - 2. Color to be selected by Architect from standard color pallet.
- G. Cleaner: Low VOC type; liquid neutral chemical cleaner, with pH factor between 7 and 8, of formulation recommended by sealer manufacture for type of precast concrete used and complying with NTMA requirements.
- H. Sealer: Low VOC type; colorless, pure acrylic water-repellent penetrating sealer. Sealer to maintain natural look of concrete surface with no glaze or gloss, darkening or color change.

2.2 PRECAST CONCRETE TREADS

- A. Manufacturers:
 - 1. Wausau Tile, Inc.; Product Precast Concrete Treads: Model C-70 Flat Tread.
 - 2. Century Group.
 - 3. Commercial Concrete Products.
 - 4. ConcreteWorks East.
- B. Provide matching precast concrete landing panels at intermediate landings.

- C. Color: Custom color accepted by Architect as similar to polished concrete finish on floors.
- D. Sizing Tolerances: Units to conform to sizes indicate on Drawings with a 1/16 inch tolerance in dimension.
- E. Coordinate with manufacturer providing assemblies specified under Division 5 Section "Decorative Metal Stairs," for preparation of treads to anchor to prefabricated stair treads; provide required anchors to decorative stair manufacture.
 - 1. All anchors must be stainless steel.
 - 2. Structural design must provide proper anchorage and tread reinforcement to accommodate design forces applied to railing system.
- F. Precast Surfaces and Edges:
 - 1. All exposed edges to be ground and polished with a minimum of 1/8" bevel.
 - 2. All finished surfaces to be ground and polished, free of holes and to have overall uniformity in matrix and aggregate.
 - 3. All precast concrete finished surfaces to be sealed with a sealer approved by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive precast concrete for the following:
 - 1. Defects in existing work.
 - 2. Deviations beyond allowable tolerances for the substrate.
- B. Start work only when all defects have been corrected by others.

3.2 INSTALLATION

- A. Alignment of precast should be straight and true to all dimensions. It may not vary more than 1/8" in length, height or width.
- B. Install anchors as shown on approved shop drawings.
- C. Fill joints between with manufacturer-approved caulk.

3.3 CLEANING AND PROTECTION

- A. Clean precast concrete surfaces according to manufacturer's written instructions.
- B. Finish: Apply sealer approved by manufacturer to all precast concrete finished surfaces.
- C. Protection: Protect the finished work until final acceptance of the Work.

END OF SECTION

SECTION 04 20 00 - UNIT MASONRY**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Concrete block.
- B. Clay facing brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Flashings.
- F. Lintels.
- G. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

- A. ACI/TMS 216.1 - Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.
- E. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2018.
- F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.
- G. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2017a.
- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.
- I. ASTM C150/C150M - Standard Specification for Portland Cement; 2017.
- J. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- K. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.
- M. ASTM C476 - Standard Specification for Grout for Masonry; 2016.
- N. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2017.
- O. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- P. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2005.
- Q. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Samples for Verification: For each type and color of the following:
 - 1. Face brick, in the form of straps of five or more bricks.
 - 2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Shop Drawings:
 - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.Fabricated
 - 2. Flashing: Detail inside/outside corner units, sill and head conditions; end-dam conditions; base-of-wall, lintel and low roof-to-wall conditions; and other special applications.
- F. Mix Designs: For each type of mortar and grout.
 - 1. Include description of type and proportions of ingredients.
 - 2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- G. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For cement, CMU, and steel reinforcement: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For products having recycled content (CMU and steel): Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - 3. MR Credit 4: BPDO - Material Ingredients
 - a. For CMU and brick: Material Ingredient Report.
 - 4. For products having regionally sourced recycled material (CMU and steel): Documentation indicating locations of recovery, manufacture, purchase of recycled raw materials.
- H. Coordinate with Construction Waste Management requirements.
- I. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.
- J. Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with hot-weather requirements.
- K. Temporary Bracing Plan:
 - 1. Provide a temporary bracing plan for the information-only of the Architect; plan to be submitted minimum two weeks prior to initiating masonry Work.
 - 2. The bracing plan must be based on the Mason Contractors Association of America's Standard Practice for Bracing Masonry Walls Under Construction, and Masonry Wall Bracing Design Handbook, or another industry recognized standard.
 - 3. Bracing plan must be reviewed by a Professional Structural Engineer licensed in the State of Maryland; Professional Structural Engineer to provide a letter certifying his review of the plan and acknowledgement of its completeness.

4. The bracing plan and Professional Structural Engineer's letter must indicate project conditions unique to any referenced standard and provide for the unique bracing required for those conditions.
5. Maintain one copy of any industry standard referenced within the plan, on project site.

1.5 QUALITY ASSURANCE

- A. Masonry Contractor Qualification:
 1. Engage a trade contractor with at least 10 years experience in masonry construction of type and scope included in the construction documents.
 2. Demonstrate experience by submitting to the Owner a list of at least 10 masonry projects of similar size, complexity and scope.
 3. Submit resumes of all key personnel that will be assigned to the Project; dedicate assigned personnel to the Project for the entire scope of Work.
- B. Comply with provisions of TMS 402/602, except where exceeded by requirements of the contract documents.
 1. Maintain one copy of each document on project site.
- C. Fire-Resistance Ratings: Where indicated, provide materials identical to those assemblies with fire-resistance ratings conforming to the Standard Method for Determining Fire Resistance of Concrete and Masonry Assemblies, ACI 216.1-97/TMS-0216-07, National Concrete Masonry Association TEK 7-1A, and ASTM E-119, and acceptable to authorities having jurisdiction.
 1. Certification of concrete masonry units for fire ratings must be provided by the National Concrete Masonry Association or qualified independent testing agency.
 2. Provide Letter of Certification for aggregates used in mix design assuring compliance with ASTM C 33 and ASTM C 331.
 3. Provide mix design and determined equivalent thickness, for units incorporating recycled content materials.

1.6 MOCK-UP

- A. Mock-up: Prior to installing unit masonry, construct sample wall panels to verify selections made under sample submittals and to demonstrate aesthetic effects as well as other qualities of materials and execution. Build mockups to comply with the following requirements, using materials for final unit of Work.
 1. Locate mockup on site within 4 weeks of Contract award in location as directed by Architect.
 2. List of Material Used in Construction Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to specifically identify exact materials used. Include mix proportions for mortar and grout and source of aggregates.
 3. Build mockup of typical wall.
 - a. Include exterior face brick wall with cast stone trim.
 - b. Include aluminum storefront frame complying with requirements of Division 8 Section "Aluminum-Framed Storefront" with applicable window lintel detail.
 - c. Seal perimeter of window complying with requirements of Division 7 Section "Joint Sealers."
 - d. Include sealant-filled control joints complying with requirements of Division 7 Section "Joint Sealers."
 4. Build mockup as detailed on the drawings.

5. Notify the Architect when mock-up is ready for inspection. Remove and replace defective and deficient parts of the wall as identified by the Architect, and replace until such time that all the work is acceptable to the Architect and Owner.
6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. Acceptance of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - b. Acceptance of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
 - c. When directed, demolish and remove mockups from Project site.

1.7 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Store masonry units, cementitious materials, and preblended, dry mortar mix on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
 3. Verify masonry protection at end of each day; inadequate protection by the trade contractor to be corrected or replaced by the Contractor, for proper protection; costs incurred by the Contractor is not the Owner's responsibility, but may be recovered under agreement with trade contractor.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
 2. Special Shapes:
 - a. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - b. Provide bullnose units for outside corners, unless otherwise indicated.
 - c. Bullnose units are not to be used at areas scheduled to be covered with tile.
 3. Load-Bearing Units: ASTM C90, normal weight.
 4. Recycled Content: Provide units having a minimum fly ash content of 10 percent.
 5. Regional Material: Provide concrete block manufactured and of raw materials extracted and/or recovered within 100 miles of project site.

2.2 BRICK UNITS

- A. Manufacturers:
1. Endicott Clay Products Company; Basis-of-Design:
 - a. Brick Type 1: Endicott Clay Products Company; Dark Ironspot Velour.
 - b. Brick Type 2: Endicott Clay Products Company; Desert Ironspot Dark.
 2. Cloud Ceramics/Carolina Ceramics:
 - a. Brick Type 1: Cloud Ceramics; Ebony.
 - b. Brick Type 2: Carolina Ceramics; Heritage.
 3. Sioux City Brick and Tile:
 - a. Brick Type 1: Sioux City Brick and Tile; Fine Art Velour.
 - b. Brick Type 2: Sioux City Brick and Tile; Toasted Fine Art Velour.
- B. Facing Brick: ASTM C 216, Type FBS, Grade SW.
1. Size: Utility.
 2. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
 3. Regional Material: Provide brick manufactured and of raw materials extracted and/or recovered within 500 miles of project site.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- B. Packaged blend of portland cement complying with ASTM C 150, Type II/I or Type III, and hydrated lime.
1. Not more than 0.60 percent alkali.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.

- F. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 - 1. Manufacturers:
 - a. Davis Colors, a division of Venator Materials PLC: www.daviscolors.com.
 - b. Lambert Corporation: www.lambertusa.com.
 - c. Solomon Colors: www.solomoncolors.com.
 - d. ESSROC Cement Corp.; Flamingo.
 - e. Lehigh Cement Company.
- G. Admixtures: Permitted for cold- and hot-weather masonry work as permitted by referenced standards; non-chloride types.
- H. Water: Clean and potable.

2.4 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. AA Wire Products Co.
 - 2. Dur-O-Wal: www.dur-o-wal.com.
 - 3. Heckman Building Products, Inc.
 - 4. Hohmann & Barnard, Inc (including Dur-O-Wal brand): www.h-b.com.
 - 5. WIRE-BOND www.wirebond.com.
 - 6. National Wire Products Industries.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.
 - 1. Recycled Content: Provide steel with minimum 90 percent total recycled content, including at least 60 percent post-consumer recycled content.
 - 2. Regional Materials: Provide steel manufactured and of primary raw materials extracted or recovered within 100 mile radius of Project Site.
- C. Joint Reinforcement - General:
 - 1. Provide in lengths of not less than 10 feet.
 - 2. Provide with prefabricated corner and tee units of same design type, wire thickness and finish as adjoining joint reinforcement.
- D. Single Wythe Joint Reinforcement: Ladder; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
- E. Adjustable Multiple Wythe Joint Reinforcement: Ladder type with adjustable ties or tabs spaced at 16 in on center ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
 - 1. Vertical adjustment: Not less than 2 inches.
 - 2. Fabricate so that tie loops are located at face of continuous insulation.
 - 3. Provide system with insulation lock washer, specifically made for reinforcement design, to hold continuous insulation in contact to backup construction.
 - 4. Products:
 - a. Hohmann & Barnard, Inc.; Product 280 Dub'l Loop-Lok Ladder with Byna Lok Wire Tie and Loop-Lok Washer: www.h-b.com.
 - b. WIRE-BOND; Product Ladder Adjustable Double Loop Tie with Lock Washers; www.wirebond.com.

- F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
1. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
- G. Masonry Veneer Anchors at Metal Stud Backup: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
1. Anchor plates: Designed for fastening to structural backup through sheathing by two fasteners.
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
 - b. Fabricate sheet metal anchor sections and other sheet metal parts from minimum 14 gage, steel sheet, galvanized after fabrication.
 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 3. Vertical adjustment: Not less than 3-1/2 inches.
 4. Products:
 - a. Hohmann & Barnard, Inc.; BL-407 Anchor with Wedge-Lok Insulation Washer.
 - b. Construction Tie Products; CTP Veneer Anchoring System with CTP Insulation Retainer Plate.
 - c. Wire Bond; 2407 Adjustable Veneer Anchor with insulation Lock Washer.
 5. Organic-Polymer-Coated, Steel Drill Screws:
 - a. Dril-Flex; Elco Industries, Inc.
 - b. Traxx; ITW-Buildex.
 - c. Triangle Fastener Company.
- H. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Screw-Attached Masonry-Veneer Anchor for Concrete: Screw with alternating threads, sealing washer and flanged head with eye for wire tie, designed for insertion into concrete in pre-drilled holes. Provide barrel length to match thickness of insulation.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:
 - 1) Heckmann Building Products Inc.; Pos-I-Tie with Triangle Wire Tie. (Basis-of-Design)
 - 2) Hohmann & Barnard, Inc.; 2-Seal Concrete Anchor with 2-Seal Byna-Lok Wire Tie.
 - 3) Wire-Bond; Tapcon Sure-Tie for Concrete and Wood.
 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
 3. Insulation Retainer: Heckman Thermal-Grip Brick Tie Washer or equivalent of other named manufacturers and accepted by continuous insulation manufacturer instead of installation pins.
- I. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by ¼ inch thick by 24 inches long, with ends turned up 2 inches unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.
- J. Reinforcing Bar Positioners:
1. Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells, or as indicated on Drawings. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either

two loops or four loops as needed for number of bars indicated. Provide units at all reinforced walls.

2. Products:
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.5 FLASHINGS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.4 mm) thick.
 2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.6 m). Provide splice plates at joints of formed, smooth metal flashing.
 3. Fabricate through-wall flashing with drip edge, unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
 4. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
 5. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.
- B. Application: Unless otherwise indicated, use the following:
 1. Where flashing is indicated to receive counterflashing, use metal flashing.
 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge.
 4. Where flashing is fully concealed, use metal flashing.
- C. Flexible Flashing:
 1. Flexible Stainless Steel:
 - a. Products of manufacturers listed below meeting indicated standards and specified manufacturer's product data characteristics, except as modified below, are acceptable for use, subject to compliance with specified requirements:
 - 1) York Manufacturing, Inc.; Multi-Flash SS (Basis-of-Design)
 - 2) Illinois Products, Inc.; IPCO Stainless Steel Fabric Flashing
 - 3) Prosoco, Inc.; R-Guard SS ThruWall
 - 4) STS Coatings, Inc.; Gorilla Flash Stainless Fabric
 - 5) TK Products, Inc.; TK TWF
 - b. Characteristics:
 - 1) Type: Stainless steel core with polymer fabric laminated to one stainless steel face with non-asphalt adhesive.
 - 2) Stainless steel type: 304, ASTM A167.
 - 3) Fabric: polymer fabric; laminated back face of stainless steel core.
 - 4) Size: Manufacturer's standard width rolls.
 - c. Accessories:
 - 1) Mastick/sealant: Basis-of-Design: York Manufacturing, Inc.; UniverSeal US100.
 - (a) Type: One part 100% solids, solvent-free formulated silyl-terminated polyether (STPE), ASTM C920-11, Type S, Grade NS, Class 50.

- 2) Outside corner and inside corner material; manufacturer's standard available units using:
 - (a) Stainless steel: 26 gauge stainless steel.
 - 3) End Dam: Product may be folded in line with the flashing material or utilize preformed end dams by manufacturer using:
 - (a) Stainless steel: 26 gauge stainless steel.
 - 4) Splice material: Basis-of-Design: York 304 SS by York; manufacturer's standard self-adhered metal material; material matching system material or use Multi-Flash Stainless Steel 6" lap piece and polyether sealant as a splice.
 - 5) Termination Bar: Basis-of-Design: York T-96 termination bar; manufacturer's standard 1" composite material bar or a 1" 26 gauge stainless steel termination bar with sealant lip.
 - 6) Weep vent protection: Basis-of-Design: York's Weep Armor; geotextile drainage fabric at least 12" in height.
 - 7) Repair and other materials/accessories: Manufacturer's standard.
 - 8) Fasteners: Domestic manufactured fastener types and sizes recommended by flashing manufacturer for intended use.
2. Flexible Stainless Steel Drainage Plane Flashing:
- a. Product: Flash-Vent Stainless Steel by York, complete with sealants, termination bars, splice material, stainless steel corners.
 - b. Characteristics:
 - 1) Provides continuous weep vent.
 - (a) Selection of this option allows contractor to eliminate separate cavity drainage material; weep vent inserts in brick head joints are still required.
 - 2) Fire Resistant: Passes ASTM E84, Class A.
- D. Flexible flashing will not extend beyond face of mortar joint at any time; where drip is indicated, drip to be provided by use of stainless steel drip plates.
- E. Stainless Steel Drip Plates:
1. Provide at flexible flashing locations, as indicated.
 2. Material: Minimum 26 gage stainless steel.
 3. Profile:
 - a. Provide with closed hemmed drip edge to extend past face of wall.
 - b. Provide vertical leg extending up backup wall minimum 2 inches.
 - c. Provide pitch in drip plate as indicated on Drawings.
 - d. Provide shop fabricated inside and outside corner.
 - e. At lip brick profiles, match profile with step in drip plate.
 4. Flexible flashing will cover drip plate; cut flush with face of mortar joint.
 5. Provide 1/8 inch thick sealant tape between drip plate and steel structural member.
 6. Bond flexible flashing to drip plate as recommended by flexible flashing manufacturer; product selection to ensure against adhesive drool beyond face of brick.
 7. Backer rod and sealant to be provided under drip edge per Division 7, at locations protecting steel.
- F. Drip Plate Fasteners - CMU Backup: Use low-velocity powder actuated ballistic point fastener with pre-mounted washer; submit ICC-ES Evaluation Report under product data submittals indicating fastener selection appropriate for intended use.
- G. Drip Plate Fasteners - Stud Backup: Corrosion-resistant screws located at every stud line.
- H. Self-adhering Flashing Seam Tape: Flexible stainless steel; stainless steel core with polymer fabric laminated to one stainless steel face with non-asphalt adhesive.

2.6 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to fully fill depth of air space, and designed to prevent mortar droppings from clogging cavity vents and allow proper cavity drainage.
 - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Manufacturers:
 - 1) Mortar Net Solutions: www.mortarnet.com/#sle.
 - 2) Keene Building Products; Product Keenestone Cut 2".
 - 3) Hohmann and Barnard, Inc.; Product Mortar Trap.
 - 4) Advanced Building Products, Inc.; Mortar Break DT: www.advancedbuildingproducts.com.
 - 5) York Flashings; Weep-Net: www.yorkmfg.com.
- C. Cavity Vents: Polyester mesh or cellular insect-resistant vents.
 - 1. Locations: Flashing location at base of cavity wall construction.
 - 2. Manufacturers:
 - a. CavClear/Archovations, Inc: www.cavclear.com/#sle.
 - b. Dur-O-Wal; Product D1006 Cell Vents: www.dur-o-wal.com.
 - c. Hohmann & Barnard, Inc; Quadro-Vent: www.h-b.com/#sle.
 - d. Mortar Net Solutions; Mortar Net Weep Vents: www.mortarnet.com/#sle.
- D. Cleaning Solution: Not harmful to masonry work or adjacent materials, as recommended by brick manufacturer.

2.7 LINTELS

- A. Concrete Lintels: Precast units made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars required to support loads indicated. Cure precast lintels by same method used for concrete masonry units.
- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam concrete masonry units with reinforcing bars placed as required and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.8 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C270, using the Property Specification.
 - 1. Interior, loadbearing masonry: Type S.
 - 2. Interior, non-loadbearing masonry: Type S.
 - 3. Masonry below grade and in contact with earth: Type M.
 - 4. Exterior, loadbearing masonry: Type S.
 - 5. Exterior, brick veneer: Type N.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 INSTALLATION - GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Do not install cracked, broken or chipped masonry units for any location to be exposed in completed work; do not install cracked, broken or chipped masonry units exceeding ASTM allowances in work to remain concealed or within mechanical or electrical spaces.
- E. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- F. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 46.

3.5 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.

- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- E. Brick Units:
 - 1. Bond: 1/3 Running Bond.
 - 2. Mortar Joints: Concave.

3.6 PLACING AND BONDING

- A. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Interlock intersections and external corners.
- D. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- F. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, cavity insulation vapor barrier adhesive is applied, or bitumen dampproofing is applied.
- G. Pointing:
 - 1. During the tooling of joints, enlarge voids and holes, and completely fill with mortar.
 - 2. Point joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance.
 - 3. Prepare joints for sealant application, where indicated.
- H. Isolate masonry partitions from vertical structural framing members with a control joint and flexible anchors.
- I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.7 CAVITY VENTS

- A. Place cavity vents such as two consecutive vertical joints will include vent followed by a vertical joint without; repeat this placement for full length of application.
- B. Install vents in contact with flashing, full-width of head joint and uninterrupted by mortar.

3.8 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar diverter at base of cavity and at other flashing locations indicated on Drawings and as recommended by manufacturer to prevent mortar droppings from blocking cavity vents.

3.9 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
 - a. Reinforcement of this subparagraph 3 is in addition to continuous reinforcement.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.
 - 1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated.
 - 2. Keep open space free of mortar and other rigid materials.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Typical: Place masonry joint reinforcement in first and second horizontal joints above and below openings.
 - 1. Extend minimum 16 inches each side of opening.
 - 2. Modify placement where flashing occurs in joint; flashing takes precedent; joint reinforcement location adjusted as accepted by Architect.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- F. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- G. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.11 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width of openings and at least 4 inches into adjacent masonry at each end; turn up not less than 2 inches to form end dams.
 - 2. Carry flashing across air space behind veneer and up face of backup construction at least 8 inches to form watertight pan; extend flashing into masonry backup minimum 1-3/4 inches; secure flashing at non-masonry construction with termination bar and seal.

3. Remove or cover protrusions or sharp edges that could puncture flashings.
 4. Embed flashings in mortar joint; place flashing on sloping bed of fresh mortar and cover with fresh mortar
 5. Seal lapped seams of stainless steel drip plates with self-adhering flashing seam tape; stop self-adhering flashing seam tape 3/8 inch of brick face and extend over turned up edge 3 inches onto backup construction; center tape on overlapping edge.
 6. Seal lapped ends and penetrations of flashing with adhesive or sealant, as recommended by flashing manufacturer, before covering with mortar.
- B. Lap end joints of flashings at least 6 inches and seal watertight as recommended by flashing manufacturer.
- C. Cut flashing flush with face of mortar joint after masonry construction is complete and inspected.

3.12 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.

3.13 GROUTED COMPONENTS

- A. Lap splices minimum 64 bar diameters.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- C. Place and consolidate grout fill without displacing reinforcing.
- D. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.14 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 48 inches.

3.15 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.16 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- E. Do not build into masonry construction organic materials that are subject to deterioration.

3.17 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/8 inch, plus 1/8 inch.

3.18 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, and conduit. Coordinate with other sections of work to provide correct size, shape, and location.

3.19 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67/C67M requirements, sampling 5 randomly chosen units for each 50,000 installed.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.
 - 1. Test three samples for each 5,000 square feet of wall or portion thereof; test one sample at 7 days and two at 28 days for each set.

3.20 REPAIRING WORK

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units; install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

3.21 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.22 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 04 72 00 - CAST STONE MASONRY**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Architectural cast stone; wet cast and acid wash finish.
- B. Units required are:
 - 1. Exterior wall units, including wall caps, coping, sills, and bands.
 - 2. Other items indicated on drawings.

1.2 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry: Installation of cast stone in conjunction with masonry.
- B. Section 07 92 00 - Joint Sealants: Sealing joints indicated to be left open for sealant.
- C. Section 07 90 05 - Joint Sealers: Materials and execution methods for sealing soft joints in cast stone work.

1.3 DESIGN REQUIREMENTS

- A. Wind Loads:
 - 1. Design anchors to withstand positive and negative wind loads acting normal to plane of wall, including increased loads at building corners.
 - 2. Design Wind Load: To design pressure of 25 psf.
- B. Design anchor attachment to cast stone with factor of safety of 5:1.
- C. Design each individual anchor with factor of safety in vertical dead-load-bearing direction of 4:1 and in horizontal lateral-load-bearing direction of 2:1.
- D. Fabrication to be per methods allowed under ASTM C 1364; wet cast.

1.4 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2016).
- B. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- D. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2009 (Reapproved 2015).
- E. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2014.
- F. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.
- G. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016.
- H. ASTM C150/C150M - Standard Specification for Portland Cement; 2017.
- I. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- J. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2016.

- K. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2013.
- L. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- M. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2016.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Test results of cast stone components made previously by the manufacturer.
 - 1. Include one copy of ASTM C1364 for Architect's use.
- C. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- D. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content cast stone: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For regionally sourced cast stone: Documentation indicating locations of recovery, manufacture, purchase of recycled raw materials.
- E. Mortar Color Selection Samples.
- F. Verification Samples: Pieces of actual cast stone components not less than 12 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.
- G. Source Quality Control Test Reports.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. A firm with a minimum of 5 years experience producing cast stone of types required for project.
 - 2. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
 - 3. Design anchors, cast units under direct supervision of Professional Engineer experienced in design of this Work and licensed in jurisdiction.
- B. Mock-Up: Provide full size cast stone components for installation in mock-up of exterior wall.
 - 1. Remove mock-up not incorporated into the work and dispose of debris.
- C. Source Quality Control: Test compressive strength and absorption of specimens selected at random from plant production.
 - 1. Test in accordance with ASTM C642.
 - 2. Select specimens at rate of 3 per 500 cubic feet, with a minimum of 3 per production week.
 - 3. Submit reports of tests by independent testing agency, showing compliance with requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- B. Number each piece individually to match shop drawings and schedule.

- C. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- F. Store mortar materials where contamination can be avoided.
- G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Architectural Cast Stone:
 - 1. Reading Rock.
 - 2. Arban Precast Stone, Ltd.
 - 3. Midwest Cast Stone.
 - 4. Nelson Precast.

2.2 ARCHITECTURAL CAST STONE

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural limestone, complying with ASTM C1364.
 - 1. Compressive Strength: Minimum 7,000 psi as specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
 - 2. Freeze-Thaw Resistance: Demonstrated by field experience.
 - 3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 5 feet.
 - 4. Color: Selected by Architect from manufacturer's full range.
 - 5. Remove cement film from exposed surfaces, by means of acid wash, before packaging for shipment.
- B. Shapes: Provide shapes indicated on drawings.
 - 1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
 - 2. Unless otherwise indicated on drawings, provide:
 - a. Wash or slope of 1:12 on exterior horizontal surfaces.
 - b. Drips on projecting components, wherever possible.
 - c. Raised fillets at back of sills and at ends to be built in.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
 - 1. Reinforcement shall be noncorrosive where faces exposed to weather are covered with less than 1.5 in. of concrete material.
 - 2. All reinforcement shall have minimum coverage of twice the diameter of the bars.
 - 3. Panels, soffits and similar stones greater than 24 in. in one direction shall be reinforced in that direction.
 - 4. Units less than 24 in. in both their length and width dimension shall be non-reinforced unless otherwise specified.
 - 5. Minimum amount of reinforcing shall be 0.25 percent of the cross section area.

2.3 MATERIALS

- A. Portland Cement: ASTM C150/C150M.
 - 1. For Units: Type I or II, white.
 - 2. For Mortar: Type I or II, except Type III may be used in cold weather.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
- D. Pigments: ASTM C979, inorganic iron oxides; do not use carbon black.
 - 1. Provide colored mortar for exposed cast stone work; color to be selected by Architect.
- E. Admixtures: ASTM C494/C494M.
- F. Integral Water-repellant: Standard product accepted by cast stone fabricator within the mix design; product for mix design and setting mortar to be from same source.
 - 1. Provide for all units and mortar.
- G. Water: Potable.
- H. Reinforcing Bars: ASTM A615/A615M deformed bars, galvanized.
 - 1. Galvanized in accordance with ASTM A767/A767M, Class I.
- I. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.
- J. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
- K. Mortar: Portland cement-lime, ASTM C 270, Type N; do not use masonry cement.
- L. Sealant: As specified in Section 07 90 05.
- M. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.4 FABRICATION

- A. General Requirements: Fabricate units straight and true to component shapes detailed, and with accurate dimension control.
 - 1. Provide holes, sleeves, and slots to receive anchors and dowels and to provide drips.
 - 2. Provide reinforcement as shown on the approved shop drawings.
 - 3. Provide anchors, inserts, dowels, etc. in accordance with approved shop drawings and as required for proper installation of cast stone units.
- B. Joints in sills and headers on multiple windows to occur at center of mullions or columns, or constructed with two equal length pieces with joint occurring in centerline of window elevation.
- C. Compressive Strength: 7,000 psi at 28 days.
- D. Air Entrainment: Not less than 4-1/2 percent nor more than 6 percent.
- E. Curing - Wet Cast Method: Cure in form overnight within a climate controlled environment.
- F. Finish: Acid wash.

2.5 SOURCE QUALITY CONTROL

- A. Test and analyze three random specimens for each 500 cubic feet, or portion thereof, of fabricated cast stone units:
 - 1. Compressive Strength: In accordance with ASTM C1194. Cold Water Absorption: In accordance with ASTM C1195.

2. Resistance to Freezing and Thawing: In accordance with ASTM C666; maximum cumulative percent mass loss in accordance with ASTM C1364.
3. Visually inspect color differences between fabricated units and approved sample in accordance with ASTM D1729.
4. Absorption: ASTM C1195; maximum 6 percent for cold water and 10 percent for boiling water at 28 days.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.
- B. Do not begin installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

- A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 20 00.
- B. Mechanically anchor cast stone units indicated; set remainder in mortar.
- C. Setting:
 1. Drench cast stone components with clear, running water immediately before installation.
 2. Set units in a full bed of mortar unless otherwise indicated.
 3. Fill vertical joints with mortar.
 4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
 5. Do not shift or tap cast stone units after mortar has achieved initial set; where adjustment is required, remove mortar and replace.
 6. Keep exposed faces free of mortar; immediately remove mortar that comes in contact with faces using brush and clean water.
- D. Joints: Make all joints 3/8 inch, except as otherwise detailed.
 1. Rake mortar joints 3/4 inch for pointing.
 2. Remove excess mortar from face of stone before pointing joints.
 3. Point joints with mortar in layers 3/8 inch thick and tool to a slight concave profile.
 4. Leave the following joints open for sealant:
 - a. Head joints in top courses, including copings, cornices and sills.
 - b. Joints in projecting units.
 - c. Joints below lugged sills.
 - d. Joints below ledge and relieving angles.
 - e. Joints labeled "expansion joint".
 5. Cut out defective mortar joints and repoint.
- E. Sealant Joints: Install sealants as specified in Section 07 90 05.
- F. Installation Tolerances:
 1. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
 2. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
 3. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.
 4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

- G. Repairs: Repair chips and other surface damage noticeable when viewed in direct daylight at 5 feet.
 - 1. Repair with matching touch-up material provided by the manufacturer and in accordance with manufacturer's instructions.
 - 2. Repair methods and results subject to Architect 's approval.

3.3 CLEANING

- A. Repair chips and other surface damage noticeable when viewed in direct daylight at 5 feet.
 - 1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
 - 2. Repair methods and results subject to Architect 's approval.
- B. Keep cast stone components clean as work progresses.

3.4 PROTECTION

- A. Protect completed work from damage.
- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.
- C. Protect from splashing by mortar and other damage.

END OF SECTION

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Structural steel framing members, support members and struts.
- B. Base plates, embedded plates, shear stud connectors and expansion joint plates.
- C. Grouting under base plates.

1.2 REFERENCE STANDARDS

- A. AISC (MANUAL) – Steel Construction Manual; American Institute of Steel Construction, Inc.
- B. AISC S303 – Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.
- C. AISC S348 – Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- D. ASTM A 36/A 36M – Standard Specification for Carbon Structural Steel.
- E. ASTM A 53/A 53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
- F. ASTM A 108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
- G. ASTM A 123/A 123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- H. ASTM A 153/A 153M – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- I. ASTM A 307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- J. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- K. ASTM A 490 – Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
- L. ASTM A 500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- M. ASTM A 501 – Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- N. ASTM A 563 – Standard Specification for Carbon and Alloy Steel Nuts.
- O. ASTM A 992/A 992M – Standard Specification for Structural Steel Shapes.
- P. ASTM C 1107/C 1107M – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).
- Q. ASTM E 94 – Standard Guide for Radiographic Examination.
- R. ASTM E164 – Standard Practice for Ultrasonic Contact Examination of Weldments.
- S. ASTM E 165 – Standard Test Method for Liquid Penetrant Examination.
- T. ASTM E 709 – Standard Guide for Magnetic Particle Examination.
- U. ASTM F 436 – Standard Specification for Hardened Steel Washers.
- V. ASTM F 959 – Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.

- W. ASTM F 1554 – Standard Specification for Anchor Bolts, Steel, 36, 55 and 105 ksi Yield Strength.
- X. AWS A2.4 – Standard Symbols for Welding, Brazing, and Non-Destructive Examination.
 - 1. American Welding Society.
- Y. AWS D1.1/D1.1M – Structural Welding Code – Steel; American Welding Society.
- Z. IBC 2015 – International Building Code.

1.3 SUBMITTALS

- A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, and locations of structural members.
 - 2. Include details of cuts, openings, attachments, fasteners, splices and camber.
 - 3. Detail all connections.
 - a. Indicate pre-tensioned and slip-critical high-strength bolted connections.
 - b. Indicate welded connections with AWS welding symbols. Include type, size and length.
 - c. Indicate all AWS weld designations for pre-qualified full and partial penetration welds and detail all joint preparations.
 - 4. Provide erection details for all field welded connections.
 - 5. For structural-steel connections indicated to comply with design loads, connections and structural analysis data shall be signed and sealed by the qualified professional engineer registered in the State of Maryland responsible for their preparation.
- C. AISC certification for fabricator and erector.
- D. Mill Test Reports: Signed by manufacturer certifying that the product complies with specified requirements. Indicate structural strength, destructive test analysis and non-destructive test analysis.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
- F. Quality control test reports for shop and field including ultrasonic test results.
 - 1. Submit certification by a Professional Engineer registered in the State of Maryland that all joint preparation for complete joint penetration welds meet AISC requirements and that all welding procedure specification requirements have been met.
- G. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section _____ and appropriate forms.
 - 1. Provide documentation of recycled content type and percentage by cost, location of extraction/recovery/harvest of primary raw materials, steel mill process, location of mill, and location of fabrication.
 - 2. Except for sizes not available from regional producers, structural steel shall be extracted/harvested/recovered and manufactured within 500 miles of the job site.

1.4 QUALITY ASSURANCE

- A. Structural steel shall be domestic origin, produced and supplied from the United States of America only.
- B. Fabricate structural steel members in accordance with AISC “Steel Construction Manual” and AISC “Code of Standard Practice for Steel Buildings and Bridges”.
- C. Comply with Section 10 of AISC “Code of Standard Practice for Steel Buildings and Bridges” for architecturally exposed structural steel.

- D. Welding: Comply with AWS D1.1, "Structural Welding Code-Steel" for procedures, tolerances, appearance and quality.
- E. Fabricator: Engage a firm experienced in fabricating structural steel similar to that indicated for this project and within 15 percent this project size, with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.
1. Provide documentation that fabricator has provided material for and erected at least 3 projects within 15 percent of project size and complexity, in the last six years.
 2. Allow the Owner's representative to visit the fabrication plant as required to inspect in place quality control procedures and structural steel fabrication.
 3. Fabricators who are not an AISC Certified Building Fabricator (BU), shall meet the following additional requirements:
 - a. Demonstrate that the fabricator has in place a quality control program for meeting IBC requirements and compliance with AISC recommendations and standards.
 - b. At no additional cost to the Owner, provide an independent shop inspection for compliance with IBC, AISC and AWS recommendations and standards. The independent inspection agency shall be different than the testing agency engaged by the Owner.
 - c. Shop inspection tasks required by AISC 360 to be performed by the fabricator's quality control personnel, shall be overseen by the independent inspector hired by the fabricator.
 - d. At completion of fabrication, and prior to erecting steel, submit a certificate of compliance signed and sealed by the third party inspector, stating that the steel fabrication complies with the requirements of the construction documents.
 - e. Shop drawings shall be signed and sealed by a professional engineer, registered in the local jurisdiction, responsible for the design of the connections. The professional engineer shall carry a minimum of \$1,000,000.00 of professional liability insurance.
 - f. The steel fabricator shall provide field repair details, along with computations, for all required field modifications. The details and calculations shall be signed and sealed by the same professional engineer that certified the shop drawings.
- F. Erector: Engage a firm experienced in erecting structural steel similar to that indicated for the project and within 15 percent of this project size, with a record of successful in-service performance.
1. Erector must be designated an AISC Certified Steel Erector (CSE).
 2. Provide documentation that the erector has erected at least 3 projects within 15 percent of project size and complexity in the last six years.
- G. Design connections not detailed on the drawings under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Maryland.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off the ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
 2. Do not store materials on structure in a manner that might cause deterioration, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.6 COORDINATION

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.7 UNIT PRICES

- A. Provide unit prices for additions to and deductions from the contract.
- B. Unit prices shall include all labor and material required for the complete installation of structural steel work, including shop drawing preparation and revisions, ordering materials, engineering, fabrication, delivery, erection and painting.
- C. Provide unit prices for two (2) classifications of steel, which shall cover all categories of structural steel required for this project.
 - 1. Classification 1 – Main Steel Framing: This shall include columns, posts, hangers, beams, girders, trusses and connections. It shall also include base plates, bearing plates, stiffeners, angles, etc., which become part of the framing.
 - 2. Classification 2 – Light Steel Framing: This shall include sub-framing for various purposes, such as mechanical openings and framing of a similar nature that may be required for the construction of the project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel angles, Channels and Plates: ASTM A 36/A 36M. ASTM A 572 where plate is noted on plans to have a yield strength of 50 ksi.
- B. Steel W Shapes and Tees: ASTM A 992/A 992M.
- C. Cold-Formed Structural Tubing: ASTM A 500, Grade C.
- D. Pipe: ASTM A 53/A 53M, Grade B, Finish black.
- E. Shear Stud Connectors: Made from ASTM A 108 Grade 1015 bars. Headed stud type.
- F. Rods: ASTM A 36/A 36M.
- G. Structural Bolts and Nuts: Carbon steel, ASTM A 307, Grade A.
- H. High-Strength Structural Bolts, Nuts, and Washers: ASTM A 325, with matching ASTM A 563 nuts and ASTM F 436 washers; Type 1, medium carbon, plain. Bolts and nuts shall be heavy hex.
- I. High Strength Structural Bolts: ASTM A 490, with matching ASTM A 563 nuts and ASTM F 436 washers; Type 1 alloy steel. Bolts and nuts shall be heavy hex.
- J. Anchor Rods: ASTM F 1554, Grade 36, plain, with matching ASTM A 563 nuts and ASTM F 436 washers.
- K. Load Indicator Washers: Provide washers complying with ASTM F 959 at all connections requiring pre-tensioned high-strength bolts.
- L. Welding Materials: AWS D1.1; type required for materials being welded.
- M. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107/C 1107M and capable of developing a minimum compressive strength of 7,000 psi at 28 days.
- N. Shop and Touch-Up Primer: Type specified in Section 09 91 20, complying with VOC limitations of authorities having jurisdiction.
- O. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Shop fabricate to the greatest extent possible.
- B. Develop required camber for members.
- C. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements of AWS D1.1.
- D. Bolt Holes: Drill or punch standard bolt holes perpendicular to metal surfaces.
- E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

2.3 FINISH

- A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted with slip-critical connections.
- B. Surface preparation: SSPC-SP2: "Hand Tool Cleaning" or SSPC-SP3, "Power Tool Cleaning".
 - 1. Refer to Division 9 for preparation of surfaces that are to receive coatings other than shop primer.
- C. Provide a dry film thickness of not less than 1.5 mil.
- D. Galvanize structural steel members to comply with ASTM A 123/A 123M. Provide minimum 1.7 oz/sq ft. galvanized coating. Galvanize shelf angles, lintels and hung plates located in exterior walls. Galvanize all exterior steel.

2.4 SOURCE QUALITY CONTROL

- A. An independent testing agency will perform source quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.2 of the 2015 IBC Code, the quality assurance inspection requirements of AISC 360 and the Statement of Special inspections noted in the structural drawings.
- B. High-Strength Bolts: Provide testing and verification of all shop-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts".
 - 1. Pre-tensioned and slip-critical bolts shall be installed using direct-tension-indicator washer method or twist-off type tension control bolt method.
- C. Welded Connections: Visually inspect all shop-welded connections and test all full penetration welds using ultrasonic testing performed in accordance with ASTM E 164.
 - 1. Inspect all joint preparations for complete joint penetration welds and verify compliance with welding procedure specification requirements.

PART 3 - EXECUTION

3.1 ERECTION

- A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".
- B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components indicated on shop drawings.
- D. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

- E. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts".
- F. Do not field cut or alter structural members without the approval of the Architect.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete and surfaces that will be fireproofed. Repair damaged galvanized coatings with galvanized repair paint.
- H. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for non-shrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.2 TOLERANCES

- A. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges".

3.3 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.2 of the 2015 IBC Code, the quality assurance inspection requirements of AISC 360 and the Statement of Special Inspections noted in the structural drawings.
- B. High-Strength Bolts: Provide testing and verification of all field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts".
 - 1. Pre-tensioned and slip-critical bolts shall be installed using direct-tension-indicator washer method or twist-off type tension control bolt method.
- C. Welded Connections: Visually inspect all field-welded connections and test all full penetration welds using ultrasonic testing performed in accordance with ASTM E 164.
 - 1. Inspect all joint preparations for complete joint penetration welds and verify compliance with welding procedure specification requirements.
- D. In addition to visual inspection, field-welded shear connectors shall be tested and inspected according to the requirements of AWS D1.1 for stud welding.
- E. Correct deficiencies in work that inspections indicate does not comply with the specified requirements.

END OF SECTION

SECTION 05 12 13 - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes architecturally exposed structural-steel framing; exposed interior columns, beams and bracing.
 - 1. Requirements in Division 05 Section "Structural Steel Framing" also apply to AESS framing.

1.2 DEFINITIONS

- A. Architecturally Exposed Structural Steel: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication of AESS components. Shop Drawings for structural steel may be used for AESS provided items of AESS are specifically identified and requirements below are met for AESS.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections. Indicate orientation of bolt heads.
 - 5. Indicate exposed surfaces and edges and surface preparation being used.
 - 6. Indicate special tolerances and erection requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

PART 2 PRODUCTS

2.1 STEEL MATERIALS

- A. Comply with Section 05 12 00 for all steel materials.

2.2 PRIMER

- A. Primer: Comply with Division 09 painting Sections.

2.3 FABRICATION

- A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.
- B. In addition to special care used to handle and fabricate AESS, comply with the following:
 - 1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
 - 2. Grind sheared, punched, and flame-cut edges of AESS to remove burrs and provide smooth surfaces and edges.
 - 3. Fabricate AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
 - 4. Fabricate AESS with exposed surfaces free of seams to maximum extent possible.
 - 5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
 - 6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
 - 7. Fabricate AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
 - 8. Seal-weld open ends of hollow structural sections with 1/4-inch closure plates for AESS.
- C. Curved Members: Fabricate indicated members to curved shape by rolling to final shape in fabrication shop.
 - 1. Distortion of webs, stems, outstanding flanges, and legs of angles shall not be visible from a distance of 20 feet under any lighting conditions.
- D. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch with a tolerance of 1/32 inch for AESS.
- E. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.4 SHOP CONNECTIONS

- A. Connection Preference: Shop connections shall be welded unless specifically indicated otherwise.
- B. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.

- C. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:
1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
 2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
 3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.
 4. Provide continuous welds of uniform size and profile where AESS is welded.
 5. Grind butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus 0 inch for AESS.
 6. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
 7. At locations where welding on the far side of an exposed connection of AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
 8. Make fillet welds for AESS oversize and grind to uniform profile with smooth face and transition.

2.5 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections.
 4. Surfaces to receive sprayed fire-resistive materials.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards as required for applied finish:
1. SSPC-SP 11, "Power Tool Cleaning to Bare Metal" or;
 2. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- C. Preparing Galvanized Steel for Shop Priming: After galvanizing, thoroughly clean steel of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

- B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS 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.
 - 1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

3.3 ERECTION

- A. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
 - 1. Erect AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
- B. Do not use thermal cutting during erection.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
 - 2. Orient bolt heads as indicated on Drawings.
- B. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.
 - 1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
 - 2. Remove erection bolts in AESS, fill holes, and grind smooth.
 - 3. Fill weld access holes in AESS and grind smooth.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Division 05 Section "Structural Steel Framing." The testing agency will not be responsible for enforcing requirements relating to aesthetic effect.
- B. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

3.6 REPAIRS AND PROTECTION

- A. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning, unless a more stringent finishing method is required for applied finish.

END OF SECTION

SECTION 05 21 00 - STEEL JOIST FRAMING**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Open web steel joists, with bridging, attached seats and anchors.
- B. Loose bearing members, such as plates and anchor bolts for site placement.
- C. Joist accessories.

1.2 REFERENCE STANDARDS

- A. AISC S348 – Specification for Structural Joints Using ASTM A 325 or A 490 bolts.
- B. ASTM A 36/A 36M – Standard Specification for Carbon Structural Steel.
- C. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- D. ASTM E 94 – Standard Guide for Radiographic Examination.
- E. ASTM E 164 – Standard Practice for Ultrasonic Contact Examination of Weldments.
- F. ASTM E 165 – Standard Test Method for Liquid Penetrant Examination.
- G. ASTM E 709 – Standard Guide for Magnetic Particle Examination.
- H. AWS D1.1/D1.1M – Structural Welding Code – Steel; American Welding Society.
- I. SJI (SPEC) – Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders; Steel Joist Institute.
- J. SSPC-SP 2 – Hand Tool Cleaning; Society for Protective Coating.
- K. IBC 2015 – International Building Code.

1.3 SPECIAL JOISTS

- A. Design special joists to withstand design loads indicated with live load deflection no greater than $L/360$ of the span.

1.4 SUBMITTALS

- A. See Section 01 30 00 – Administrative requirements for submittal procedures.
- B. Shop Drawings: Show layout, designation, number, type, location, and spacing of joists. Include joining and anchorage details, bracing, bridging, joist accessories, splice and connection locations and details; and attachments to other construction.
 - 1. Indicate locations and details of bearing plates to be embedded in other construction.
 - 2. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer licensed in the State of Maryland who is responsible for its preparation.
- C. Welding Certificates.
- D. Manufacturer's Certificates: Signed by manufacturers certifying that joists comply with requirements.
- E. Manufacturer's Mill Certificates: Signed by bolt manufacturers certifying that bolts comply with requirements.
- F. LEED Report: Accurately document the use of recycled materials and local/regional materials as required by Section ____ and appropriate forms.

1. Provide documentation of recycled content type and percentage by cost, location of extraction/recovery/harvest of primary raw materials, steel mill process, location of mill and location of fabrication.
2. Steel joists shall be extracted/recovered/harvested and manufactured within 500 miles of the job site.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable specifications and load tables of SJI "Specifications".
 1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
- B. SJI Specifications: Comply with standard specification in SJI's "Specifications" that are applicable to types of joists indicated.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M "Structural Welding Code – Steel".

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Open Web Joists: SJI Type K and KCS Joists:
 1. Provide bottom and top chord extensions as indicated.
 2. Finish: Shop primed.
- B. Open Web Joists: SJI Type LH and DLH Joists:
 1. Provide bottom and top chord extensions as indicated.
 2. Finish: Shop primed.
- C. Steel: Comply with SJI's Specifications for web and angle chord members.
- D. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel bolts with ASTM A 563 heavy hex nuts and ASTM F 436 washers; plain.
- E. Structural Steel for Supplementary Framing: ASTM A 36/A 36M.
- F. Welding Materials: AWS D1.1; type required for materials being welded.
- G. Shop and Touch-Up Primer: Type specified in Section 09 91 20, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Manufacture steel joists to meet SJI's "Specifications", with steel angle top and bottom- chord members; of joist type and end and top-chord arrangements as indicated.
- B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
- C. Provide holes in chord members for connecting and securing other construction to joists.
- D. Camber steel joists according to SJI's "Specifications".
- E. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds ¼ inch per twelve inches.
- F. Bridging: Provide bridging anchors and number of rows of horizontal and diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Provide additional erection bridging if required for stability and where indicated on the Drawings.

- G. Fabricate steel bearing plates with integral anchorages of sizes and thicknesses indicated. Shop prime paint.
- H. Supply ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within ½ inch of finished wall surface unless otherwise indicated.
- I. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.3 FINISH

- A. Prepare surfaces to be finished in accordance with SSPC-SP 2.
- B. Apply shop primer to joists and joist accessories to provide a continuous dry paint film not less than 2 mil thick; apply two coats of shop primer if necessary to meet specified dry film thickness.

PART 3 - EXECUTION

3.1 ERECTION

- A. Erect joists with correct bearing on supports.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- D. Coordinate placement of anchors in concrete and masonry construction for securing bearing plates.
- E. Position and field weld joist chord extensions and wall attachments as detailed.
- F. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.
- G. Do not field cut or alter structural members without approval of joist manufacturer.
- H. After erection, prime welds and damaged shop primer, except surfaces specified not to be primed.

3.2 TOLERANCES

- A. Maximum Variation From Plumb: ¼ inch.
- B. Maximum Offset From True Alignment: ¼ inch.

3.3 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.2 of the 2015 IBC Code and the Statement of Special Inspections noted in the structural drawings.
- B. High-Strength Bolts: Provide testing and verification of all field-bolted connections in accordance with AISC "Specification for Structural Joists Using ASTM A 325 or A 490 Bolts".
- C. Welded Connections: Visually inspect all field-welded connections and test 100 percent of full-penetration welds using ultrasonic testing performed in accordance with ASTM E 164.
- D. Correct deficiencies in work that inspections indicate are not in compliance with specified requirements.

END OF SECTION

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SECTION 05 31 00 - STEEL DECKING**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Acoustical roof deck.
- B. Roof deck.
- C. Composite floor deck.
- D. Metal form deck.
- E. Supplementary framing for openings up to and including 12 inches.
- F. Bearing plates and angles.
- G. Stud shear connectors.
- H. Acoustical insulation in roof deck flutes.

1.2 REFERENCE STANDARDS

- A. ASTM A 36/A 36M – Standard Specification for Carbon Structural Steel.
- B. ASTM A 108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
- C. ASTM A 653/A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM A 1008/A 1008M – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened.
- E. AWS D1.1/D1.1M – Structural Welding Code – Steel; American Welding Society.
- F. AWS D1.3 – Structural Welding Code – Sheet Steel, American Welding Society.
- G. SDI (DM) – Publication No. 31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute.
- H. SSPC-Paint 20 – Zinc-Rich Primers (Type I, “Inorganic”, and Type II “Organic”); The Society for Protective Coatings.

1.3 SUBMITTALS

- A. See Section 01 30 00 – Administrative Requirements, for submittals procedures.
- B. Shop Drawings: Indicate deck plan, support locations, anchorage details, projections, openings, reinforcement, cellular raceways and outlet box locations, pertinent details, and accessories.
- C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- D. Certificates: Certify that products furnished meet or exceed specified requirements.
- E. Welders Certificates: Certify welders employed on the Work are certified to perform welding according to AWS requirements with AWS 1.3 qualification within the previous twelve months.
- F. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section ____ and appropriate forms.
 - 1. Provide documentation of recycled content type and percentage by cost, location of extraction/recovery/harvest of primary raw materials, steel mill process, location of mill, and location of fabrication.

2. All steel decking shall be extracted/harvested/recovered and manufactured within 500 miles of the job site.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this Section with minimum of 5 years of documented experience.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers, slope for positive drainage.

PART 2 - PRODUCTS

2.1 STEEL DECK

- A. Acoustical Roof Deck: Non-composite type, steel sheet with plain vertical flute faces perforated with 1/8 inch diameter holes staggered 3/8 inch on center.
 1. Galvanized Steel Sheet: ASTM A 653/A 653M. Structural Steel (SS), with G60/Z180 galvanized coating.
 - a. Grade 33.
 2. Sound absorbing elements and spacers shall be furnished under this Section for installation by the roofing contractor.
- B. Roof Deck: Non-composite type, fluted steel sheet.
 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), with G60/Z180 galvanized coating.
 - a. Grade 33.
- C. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete.
 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Designation SS, with G60/Z180 galvanized coating.
 - a. Grade 50.
- D. Metal Form Deck: Corrugated Sheet Steel:
 1. Galvanized Steel Sheet: ASTM A 653/A 653M. Designation SS with G60/Z180 galvanized coating.
 - a. Grade 80.

2.2 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A 36/A 36M steel.
- B. Stud Shear Connectors: Made from ASTM A 108/A 108M Grade 1015 bars.
- C. Welding Materials: AWS D1.1.
- D. Fasteners: Galvanized hardened steel, self tapping screws, No. 10 minimum.
- E. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.
- F. Shop and Touch-Up Primer: Type specified in Section 09 91 20, complying with VOC limitations of authorities having jurisdiction.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- H. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.
- I. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu. ft. density; profiled to suit deck.

2.3 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gage minimum thick sheet steel; of profile and size as indicated; material and finish same as deck.
- B. Cant Strips: Formed sheet steel, 16 gage thick, 45 degree slope, 3½ inch nominal width and height, flange for attachment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before permanently fastening.
- C. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck and support of other work.
- D. Weld deck in accordance with AWS D1.3.
- E. Where deck changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.
- F. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.
- G. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- H. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- I. Place metal cant strips in position and field weld.
- J. Weld stud shear connectors through steel deck to structural members below.
- K. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.3 ROOF DECK INSTALLATION

- A. Fasten roof deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1½ inches long, and as follows:
 - 1. Weld Diameter: ¾ inch, nominal.
 - 2. Weld Spacing: Weld edge ribs of panel at each support; space additional welds at 12" o.c. and as indicated on Drawings.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 36 inches, and as indicated on Drawings.
 - 1. Mechanically fasten with self-drilling, No.10 diameter or larger, carbon-steel screws.
 - 2. Fasten with a minimum of 1½ inch-long welds.

- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1½ inches, with end joints lapped 2 inches minimum.

3.4 FLOOR DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: ¾ inch, nominal.
 - 2. Weld Spacing: Weld edge ribs of panel at each support and at 12" on center.
- B. Side-lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches, and as indicated on Drawings.
 - 1. Fasten with a minimum of 1½ inch long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1½ inches, with end joints butted.

3.5 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.2 of the 2015 IBC Code and the Statement of Special Inspections noted in the structural drawings.
- B. Inspection shall include, but not be limited to, deck alignment, support, welds, side lap attachments and touch-up galvanizing.
- C. Remove and replace work that does not comply with specified requirements.

END OF SECTION

SECTION 05 40 00 - COLD-FORMED METAL FRAMING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Formed steel stud exterior wall framing.
- B. Formed steel joist framing and bridging.
- C. Any other framing identified on the drawings as Cold-Formed Metal Framing.

1.2 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- B. 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)
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- F. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2015.
- G. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a (Reapproved 2015).
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (with March 2016 Errata).
- I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- J. International Building Code.

1.3 DESIGN REQUIRMENTS

- A. Axial and wind load bearing elements shall be designed to the following conditions unless more stringent requirements are imposed by governing code; these requirements take precedent when more stringent than governing code.
 - 1. Live/Snow Loads on Roofs: Per ASCE 7-10 and Prince George's County IBC 2015 Amendments.
 - 2. Dead Load - Pitched Roof Rafters or Trusses: Total of all permanently installed material including roofing, structural frame, accessories and all equipment that is fixed in position.
 - 3. Wind Loads: Loads specified in pressure study prepared by the licensed Professional Engineer.
 - 4. Gravity loads should be per ASCE 7.
- B. Maximum Allowable Deflection:
 - 1. Backing of Masonry Veneer: 1: 600.
 - 2. Other Systems: 1: 240 of span.

- C. Wall and General System:
 - 1. Design to AISI SG-973 Cold-Formed Steel Design Manual.
 - 2. Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 - 3. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
 - 4. Design to meet loading and anchorage requirements for window systems and curtainwall system must be based on calculations provided by the respective subcontractors.
 - 5. Design cold-formed metal truss framing for exterior soffits to meet applicable wind uplift requirements.
 - 6. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as in accordance with IBC code.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
 - 1. Indicate stud, ceiling joist, roof joist, roof rafter, and roof truss layout.
 - 2. Describe method for securing studs to tracks and for bolted framing connections.
 - 3. Provide calculations for loadings and stresses of specially fabricated framing, stamped by a Professional Structural Engineer licensed in the State of Maryland, who is responsible for its preparation.
 - 4. Provide details, shop drawings and calculations for factory-made framing connectors, stamped by a Professional Structural Engineer licensed in the State of Maryland, who is responsible for its preparation.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content steel: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For regionally sourced steel: Documentation indicating locations of recovery, manufacture, purchase of recycled raw materials.

1.5 QUALITY ASSURANCE

- A. Calculate structural properties of framing members in accordance with requirements of AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
 - 1. Maintain one copy of document on project site.

1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as indicated on the drawings.

PART 2 PRODUCTS

2.1 FRAMING SYSTEM

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

2.2 FRAMING MATERIALS

- A. Recycled Content: Provide steel with at least 25 percent post-consumer recycled content.
- B. Regional Materials: Provide 25 percent of steel manufactured and containing recycled raw materials recovered within 100 mile radius of Project Site.
- C. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
 - 1. Gage and Depth: As required to meet specified performance levels.
 - 2. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.
 - 3. Provide components fabricated from ASTM A1008/A1008M, Designation SS (structural steel).
- D. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
 - 1. Base Metal: Structural Steel (SS), Grade 33/230 minimum.
 - 2. Gage and Depth: As required to meet specified performance levels.
- E. Framing Connectors: Factory-made, formed steel sheet.
 - 1. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 - 2. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
 - a. Where continuous studs bypass elevated floor slab, connect stud to slab in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
 - b. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
 - c. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 10 feet.
 - d. Acceptable Products: VertiClip(r) or DriftClip(tm) manufactured by The Steel Network Inc.
 - 3. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.

2.3 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.4 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

- B. Anchorage Devices: Powder actuated.
- C. Welding: In conformance with AWS D1.1/D1.1M.

2.5 SHOP FABRICATED ASSEMBLIES

- A. Shop fabricate metal framing to the greatest extent possible.
- B. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.
- C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 EXECUTION

3.1 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- D. Install load bearing studs full length in one piece. Splicing of studs is not permitted.
- E. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- F. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- G. Install intermediate studs above and below openings to align with wall stud spacing.
- H. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- I. Attach cross studs to studs for attachment of fixtures anchored to walls.
- J. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- K. Touch-up field welds and damaged galvanized surfaces with primer.

3.2 INSTALLATION OF JOISTS AND PURLINS

- A. Install framing components in accordance with manufacturer's instructions.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.
- C. Set floor and ceiling joists parallel and level, with lateral bracing and bridging.
- D. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.
- E. Provide web stiffeners at reaction points.
- F. Touch-up field welds and damaged galvanized surfaces with primer.

3.3 TOLERANCES

- A. Maximum Variation from True Position: 1/8 inch.
- B. Maximum Variation of any Member from Plane: 1/8 inch.

3.4 FIELD QUALITY CONTROL

- A. Engage a qualified independent testing and inspection agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Perform inspections in order to assure strict conformance to the shop drawings at all phases of construction.
 - 2. Check members for proper alignment, bearing, completeness of attachments, proper alignment, reinforcement, etc.
 - 3. Check attachments for conformance with the shop drawings; all welds shall be touched up as specified.
 - 4. Complete general inspection of structure prior to applying loads to those members.
 - 5. Inspections where and as required by local codes shall be controlled inspections.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Rough hardware.
- B. Steel ladders.
- C. Loose bearing and leveling plates.
- D. Loose steel lintels.
- E. Shelf angles.
- F. Support angles for elevator door sills.
- G. Steel framing and supports for overhead doors.
- H. Steel framing and supports for countertops.
- I. Steel framing and support for therapy swing.
- J. Steel framing and supports for mechanical and electrical equipment.
- K. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- L. Miscellaneous metal trim.
- M. Metal bollards.
- N. Elevator sump grates.
- O. Miscellaneous storm drainage piping specialties.
- P. Pipe Grid.
- Q. Custom Corridor bench standards.

1.2 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (with March 2016 Errata).

1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel," AWS D1.2 "Structural Welding Code--Aluminum," and AWS D1.3 "Structural Welding Code--Sheet Steel."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.4 SUBMITTALS

- A. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
 1. For installed products indicated to comply with design loads include structural analysis data and shop drawings signed by the qualified professional engineer responsible for their preparation.
- B. Samples representative of materials and finished products as may be requested by Architect.
- C. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include a list of completed projects with project name, addresses, names of architects and owners, and other information specified.
- E. Qualification data for professional engineer responsible for designing fabrications indicated to comply with specific design loads.
- F. LEED Submittals: Comply with Section 018113.
 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content steel: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Metal Surfaces, General:
 1. For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes.
 2. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
 3. Recycled Content: Provide steel with at least 25 percent post-consumer recycled content.
 4. Domestic Origin: The Contractor shall comply with Section 17-301 through Section 17-306 of Annotated Code of Maryland, State Finance and Procurement Article; refer to Section 01 41 00, Regulatory Requirements, for additional information.
- B. Steel Sections: ASTM A 36/A 36M.

- C. Steel Tubing: Product type (manufacturing method) and as follows:
 - 1. Cold-Formed Steel Tubing: ASTM A 500.
 - 2. Hot-Formed Steel Tubing: ASTM A 501.
 - a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.
- D. Plates: ASTM A283/A283M.
- E. Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.
 - 1. Galvanized finish for exterior installations and where indicated.
 - 2. Black finish elsewhere, unless otherwise indicated.
- F. Gray-Iron Castings: ASTM A 48, Class 30.
- G. Malleable-Iron Castings: ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010).
- H. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.
- I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.2 MATERIALS - ALUMINUM

- A. General:
 - 1. Recycled Content: Give preference to aluminum with the highest recycled content feasible.
 - 2. Regional Materials: Give preference to aluminum manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.
- B. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632 (ASTM B 632M) Pattern 1, alloy 6061-T6.

2.3 PAINT

- A. Shop Primer for Ferrous Metal - Interior Locations, Loose Lintels, Plates, etc.: Refer to Division 9 painting specifications.
- B. Shop Finish - Exterior Fabrications (Stairs, Ladders, Frames, etc):
 - 1. Prepare galvanized surfaces as required by paint manufacturer.
 - 2. Electrostatic application of epoxy powder primer with 375f minimum 15 minute duration heat cure for maximum corrosion protection.
 - 3. Immediate electrostatic application of TGIC polyester powder color coat while metal temperature is minimum of 300f and heat cure for minimum 10 minutes at 400f.
 - 4. This process provides an average of 8-10 mils total coating thickness.
 - 5. Color to be selected by Architect.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with SSPC-Paint 20.
- D. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.4 FASTENERS

- A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), with hex nuts, ASTM A 563 (ASTM A 563M), and, where indicated, flat washers.
- C. Machine Screws: ANSI B18.6.3.
- D. Lag Bolts: ANSI B18.2.1 (ANSI B18.2.3.8M).
- E. Plain Washers: Round, carbon steel, ANSI B18.22.1 (ANSI B18.22M).
- F. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
 - 1. Material - General: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material - Exposed exterior or in contact with ground: Group 1 alloy 304 or 316 stainless-steel bolts and nuts complying with ASTM F 593 (ASTM F 738M) and ASTM F 594 (ASTM F 836M).
- H. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.

2.5 GROUT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Construction Grout; W. R. Bonsal Co.
 - 2. Sure-grip High Performance Grout; Dayton Superior Corp.
 - 3. Euco N-S Grout; Euclid Chemical Co.
 - 4. Crystex; L & M Construction Chemicals, Inc.
 - 5. Masterflow 928 and 713; Master Builders Technologies, Inc.
 - 6. Sealtight 588 Grout; W. R. Meadows, Inc.
 - 7. SonogROUT 14; Sonneborn Building Products--ChemRex, Inc.

2.6 FABRICATION

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 120 deg F.
- D. Shear and punch metals cleanly and accurately; remove burrs.
- E. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Remove sharp or rough areas on exposed traffic surfaces.
- G. 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 contour of welded surface matches those adjacent.
- H. 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.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- M. Fabricate items with joints tightly fitted and secured.
- N. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- O. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.7 ROUGH HARDWARE

- A. Furnish bent, or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.8 STEEL LADDERS

- A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details, and anchorages as indicated. Comply with requirements of ANSI A14.3.

- B. Siderails: Continuous, steel, 1/2-by-2-1/2-inch flat bars, with eased edges, spaced 18 inches apart.
- C. Bar Rungs: 3/4-inch diameter steel bars, spaced 12 inches o.c.
- D. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
- E. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet o.c. with welded or bolted steel brackets.
 - 1. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.
 - 2. Extend side rails 42 inches above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.
- F. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to the rung by a proprietary process.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Mebac, IKG Borden.
 - b. SLIP-NOT, W. S. Molnar Co.
- G. Galvanize ladders, including brackets and fasteners, in the following locations:
 - 1. Elevator pit.

2.9 LOOSE STEEL LINTELS

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels for equal bearing of 1 inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.
- D. Hot dip galvanize loose steel lintels located in exterior walls.

2.10 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of the required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.11 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors; furnish inserts if units must be installed after concrete is placed.
 - a. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.

- C. Galvanize miscellaneous framing and supports in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.12 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
- B. Provide cutouts, fittings, and anchorages as required to coordinate assembly and installation with other Work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.
- C. Galvanize miscellaneous steel trim in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.13 FRAME AND GRATE FOR ELEVATOR SUMP

- A. Basis-of-Design: Model R-4810-C by Neenah Foundry Company.
- B. Frames and grates to be Gray Iron, Class 35.

2.14 MISCELLANEOUS STORM DRAINAGE PIPING SPECIALTIES

- A. Downspout Boots: Provide downspout boots made from cast gray iron in heights indicated with inlets of size and shape to suit downspouts.
 - 1. Outlet: NPS 4 (DN 100) outlet, to discharge into pipe.
 - 2. Cast with ears to attach to building.
 - 3. Size: Inlet size to match downspout and NPS 4 (DN 100) outlet.
 - 4. Finish: Shop-applied bituminous coating.
- B. Downspout Adaptors: Provide downspout adaptors made from cast gray iron casting, for attaching to horizontal-outlet, parapet roof drain and to exterior, sheet metal downspout.
 - 1. Inlet size to match parapet drain outlet.

2.15 PIPE BOLLARDS

- A. Provide Schedule 40 black steel pipe of size and height indicated as detailed on the Drawings.
- B. Permanent Setting:
 - 1. Set posts in concrete to a depth of 3'-0"; footing diameter minimum 3 times post diameter.
 - 2. Fill posts completely with concrete and dome on top.
- C. Finish: Painted as specified in Division 9 "Exterior Painting."

2.16 PIPE GRID

- A. Provide pipe grid where indicated.
- B. Pipe grid consists of a set of pipe battens installed (in plan) perpendicular to the joists.
- C. Individual pipe battens in each set to be located on 6-foot centers.
- D. Rest end of pipe battens on a shelf angle (3 inches x 2 inches) on sides that have masonry wall and secure in place by means of "U" bolts at ends of all pipes.
- E. Rigidly support pipe grid by means of 1/2 inch threaded rods located on centers that shall not exceed 8 feet.
- F. Assemble entire grid into a unit structure.

- G. Pipe battens that compose the grid consists of 1-1/2 inch, Schedule 40, black pipe with battens spanning from wall to wall.
- H. Connect hangers to the overhead structure; hangers provided at each joist where joist crosses the line of the pipe batten.

2.17 FINISHES - STEEL AND IRON

- A. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process complying with the following requirements:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch (0.76 mm) thick or thicker.
- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6 "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3 "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting.

2.18 FINISHES - ALUMINUM

- A. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Class I Natural Anodized Finish (unless indicated otherwise): AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.19 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

2.20 STRUCTURAL THERMAL BREAK MATERIAL

- A. Refer to Section 07 21 60, Structural Thermal Break.

PART 3 EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.
- B. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- E. 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 contour of welded surface matches those adjacent.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.3 SETTING LOOSE PLATES

- A. Clean concrete bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
 - 1. Use nonshrink, nonmetallic grout, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a 2.0-mil (0.05-mm) minimum dry film thickness.
- B. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 05 51 00 - METAL STAIRS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Stairs with concrete treads.
- B. Structural steel stair framing and supports.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal anchors in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- C. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2017.
- D. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (with March 2016 Errata).
- E. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 1. Must be prepared qualified engineer engaged by the manufacturer; structural analysis data and shop drawings to be signed and sealed by professional engineer licensed in the State of Maryland.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings and cover sheet of calculations.
- C. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content steel: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
- D. Welders' Certificates.

1.5 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design stair treads as a structural component of stair system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
 - 1. Uniform Load: 100 lbf/sq. ft.
 - 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.

3. Uniform and concentrated loads need not be assumed to act concurrently.
 4. Limit deflection of treads, platforms, and framing members to L/240 typical; L/360 for precast treads; or 1/4 inch, whichever is less.
- C. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.6 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State of Maryland, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.1 METAL STAIRS - GENERAL

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
 2. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.
 3. Dimensions: As indicated on drawings.
 4. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
 5. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
 6. Separate dissimilar metals using paint or permanent tape.
- B. Metal Jointing and Finish Quality Levels:
1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
 - a. Welded Joints: Continuously welded and ground smooth and flush.
 - b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
 - c. Exposed Edges and Corners: Eased to small uniform radius.
 - d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.
- C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.2 METAL STAIRS WITH CONCRETE TREADS

- A. Jointing and Finish Quality Level: Architectural, as defined above.
- B. Risers: Perforated in pattern matching decorative stairs specified under Section 05 71 13.
- C. Treads: Metal pan with field-installed concrete fill.
1. Concrete Depth: 1-1/2 inches, minimum.
 2. Tread Pan Material: Steel sheet.
 3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.

4. Concrete Reinforcement: None.
 5. Concrete Finish: For resilient floor covering.
- D. Stringers: Rolled steel channels.
1. Stringer Depth: 12 inches unless greater is indicated on Drawings.
 2. End Closure: Sheet steel of same thickness as risers welded across ends.
- E. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.
- F. Finish: Shop- or factory-prime painted.
- G. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.3 MATERIALS

- A. Recycled Content: Provide steel with at least 25 percent post-consumer recycled content.
- B. Steel Sections: ASTM A 36/A 36M.
- C. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).
 2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).
- D. Concrete Fill: Portland cement Type I, 3000 psi 28 day strength, 2 to 3 inch slump.
- E. Concrete Reinforcement: Mesh type as detailed, galvanized.

2.4 SHOP FINISHING

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime Painting: Use specified shop- and touch-up primer.
1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
 2. Number of Coats: One.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. When field welding is required, clean and strip primed steel items to bare metal.
- B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.3 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
- C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

- F. Obtain approval prior to site cutting or creating adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 05 51 19 - METAL GRATING STAIRS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes industrial-type, straight-run stairs with steel-grating treads and railings attached to metal grating stairs.

1.2 ACTION SUBMITTALS

- A. Product Data: For metal grating stairs.
- B. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content metal: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For regionally sourced recycled content metal: Documentation indicating locations of recovery, manufacture, purchase of recycled raw materials.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments.
 - 1. Must be prepared qualified engineer engaged by the manufacturer; structural analysis data and shop drawings to be signed and sealed by professional engineer licensed in the State of Maryland.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings and cover sheet of calculations.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design stairs and railings.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Uniform Load: 100 lbf/sq. ft. (4.79 kN/sq. m).
 - 2. Concentrated Load: 300 lbf (1.33 kN) applied on an area of 4 sq. in. (2580 sq. mm)
 - 3. Uniform and concentrated loads need not be assumed to act concurrently.
 - 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
- C. Structural Performance of Railings: Railings must withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m)
 - b. Infill load and other loads need not be assumed to act concurrently.

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Steel Bars for Grating Treads: ASTM A 36/A 36M or steel strip, ASTM A 1011/A 1011M or ASTM A 1018/A 1018M.
- E. Wire Rod for Grating Crossbars: ASTM A 510 (ASTM A 510M).
- F. Cast-Abrasive Nosings: Cast iron, with an integral abrasive, as-cast finish consisting of aluminum oxide, silicon carbide, or a combination of both.
- G. Tubing: ASTM A 500 (cold formed).
- H. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- I. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- J. Galvanizing: In accordance with requirements of ASTM A 123/A 123M.
 - 1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

2.2 FASTENERS

- A. Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Post-Installed Anchors: Chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

2.3 MISCELLANEOUS MATERIALS

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.4 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
- B. Weld connections 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. Weld exposed corners and seams continuously unless otherwise indicated.
 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 4 welds: good quality, uniform undressed weld with minimal splatter.
- C. Fabricate joints that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.5 STEEL-FRAMED STAIRS

- A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," Industrial Class, unless more stringent requirements are indicated.
- B. Stair Framing:
1. Fabricate stringers of steel channels.
 - a. Provide closures for exposed ends of channel stringers.
 2. Construct platforms of steel channel headers and miscellaneous framing members as needed to comply with performance requirements.
 3. Finish: Galvanized.
- C. Metal Bar-Grating Stairs: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."
1. Fabricate treads and platforms from pressure-locked steel grating with openings in gratings no more than 5/16 inch (8 mm) in least dimension.
 2. Surface: Plain.
 3. Finish: Galvanized.
 4. Fabricate grating treads with cast-abrasive nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.

2.6 STAIR RAILINGS

- A. Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion. Repair galvanize finish for railings.
- B. Form changes in direction as follows:
1. By bending.
- C. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- D. Close exposed ends of railing members with prefabricated end fittings.
- E. Finish: Galvanized.

2.7 FINISHES

- A. Finish metal stairs after assembly.
- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
- C. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise

indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- B. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.

3.2 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 05 52 13 - PIPE AND TUBE RAILINGS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Wall mounted handrails.
- B. Stair railings and guardrails.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of anchors in masonry.
- C. Section 09 21 16 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.
- D. Section 09 2116 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.3 REFERENCE STANDARDS

- A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2016.
- C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- D. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2015.
- E. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013.
- F. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).
- G. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2007.
- H. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Non-welded field connections in aluminum handrails to be limited to greatest fabricated section lengths; locations accepted by Architect and consistent for multiple locations.
- C. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content metal: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For regionally sourced recycled content metal: Documentation indicating locations of recovery, manufacture, purchase of recycled raw materials.

1.5 QUALITY ASSURANCE

- A. Mock-up: Build mock-up section of guardrail with attached handrail to demonstrate aesthetic effects and set quality standards for fabrication and erection.
 - 1. Size: 42 inches high x 48 inches wide.

PART 2 PRODUCTS

2.1 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.
- B. Design railing assembly, wall rails, and attachments to resist lateral force of 75 lbs at any point without damage or permanent set. Test in accordance with ASTM E 935.
- C. Allow for expansion and contraction of members and building movement without damage to connections or members.
- D. Dimensions: See drawings for configurations and heights.
 - 1. Infill: Round vertical pickets; size and spacing indicated on drawings.
- E. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
 - 2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
 - 3. For anchorage to stud walls, provide backing plates, for bolting anchors.
- F. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.2 STAINLESS STEEL RAILING SYSTEM

- A. Tubing: ASTM A 554, Grade MT 304.
- B. Pipe: ASTM A 312/A 312M, Grade TP 304.
- C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
- D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.
- E. Bars and Shapes: ASTM A 276, Type 304.

2.3 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M, Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.
- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.4 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.

- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Close exposed ends of railing members with prefabricated end fittings.
- E. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.
- F. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
 - 2. Wall brackets for aluminum railing may be cast aluminum or stainless steel; wall brackets for aluminum rails connecting to steel guardrail systems must be stainless steel and also used for wall-mounted handrails in same area.
- G. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- H. For railing posts set in concrete, provide stainless-steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.
- I. Welded Joints:
 - 1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Interior Components: Continuously seal joined pieces by continuous welds.
 - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
 - 4. Select proper welding method to result in consistent finish with final finish.
- J. Stainless Steel Handrail Field Joints:
 - 1. Fabricate sleeves for tight press fit; keep sleeves round.
 - 2. Cut handrail ends square and to accurate length to assure smooth, tight joints.
 - 3. Fasteners: Type 304 stainless-steel tamper-resistant flat head fasteners.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Anchor railings securely to structure.

- D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E. Handrail Field Joints:
 - 1. Clean area to be joined thoroughly.
 - 2. Apply epoxy adhesive to inside of pipe.
 - 3. Insert sleeve and fit components together, wipe excessive adhesive.
 - 4. Provide stainless steel set screws concealed on underside of handrail; fill head with epoxy setting adhesive and clean excess.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 53 20 - STAIR NOSINGS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Extruded aluminum stair nosings.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturers product specifications, installation and maintenance instructions.
- C. Samples for initial selection, in the form of manufacturer's color charts or sections of units showing the full range of colors.
- D. Samples for verification, in the form of sections of units in manufacturer's standard sizes; prepare samples from same material to be used for the Work.

1.3 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain stair nosings from one source and from a single manufacturer.

1.4 SEQUENCING AND SCHEDULING

- A. Coordinate with metal stairs so that nosing sub-bases are available for placing integrally with metal pan stair fill.

PART 2 PRODUCTS**2.1 EXTRUDED ABRASIVE NOSINGS**

- A. Provide extruded aluminum units with abrasive filler consisting of aluminum oxide or silicon carbide grits, or a combination of both, in an epoxy-resin binder. Furnish in lengths as required to accurately fit each opening or conditions.
 - 1. Provide ribbed units, with abrasive filler strips projecting 1/16 inch (1.5 mm) above the aluminum extrusion and having the maximum recycled content feasible.
 - a. Primary Color: To be selected.
 - b. Highlight Color: Contrasting; to be selected.
 - 2. Provide two-piece design. Sub-channel to be set with stair pan fill (use plywood filler for tread).
- B. 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. American Safety Tread Co., Inc.; TP-311 Ribbed
 - 2. Babcock Davis; Model P3.375E
 - 3. Balco/Metalines, Inc.; DST-330
 - 4. Wooster Products, Inc.; WP-RN3SG
- C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with the manufacturer.
- D. Drill for mechanical anchors with countersunk holes located not more than 4 inches (100 mm) from ends and not more than 12 inches (300 mm) o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by the manufacturer.
- E. Set elevation of sub-channel and concrete fill levels to provide flush installation to top of finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Furnish sub-channel to exterior concrete step installer for installation at appropriate time.

3.2 INSTALLATION

- A. Install stair nosings in accordance with manufacturer's instructions.
- B. Install sub-channel with concrete fill.
- C. Install tread insert prior to Substantial Completion and protect from damage until acceptance; set insert in sealant applied to sub-channel and clean any sealant seeping from joint following installation of insert.
- D. Work shall be aligned plumb, level, and, where required, flush with adjacent surfaces and rigidly anchored to the substrate.
- E. Clean exposed surfaces as recommended by the manufacturer.

END OF SECTION

SECTION 05 71 13 - DECORATIVE METAL STAIRS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes steel-framed decorative metal stairs; prefabricated steel stair including double channel or tube stringers carrying bent plate treads and risers; high performance finish applied by stair assembly manufacturer.
- B. Locations: Stair 1 Lobby Stair and Common Stairs D1.

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

- A. Product Data: For metal stairs and the following:
 - 1. Paint products.
 - 2. Grout.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Must be prepared qualified engineer engaged by the manufacturer; structural analysis data and shop drawings to be signed and sealed by professional engineer licensed in the State of Maryland.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings and cover sheet of calculations.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.5 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design stair treads as a structural component of stair system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
 - 1. Uniform Load: 100 lbf/sq. ft.
 - 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
 - 3. Uniform and concentrated loads need not be assumed to act concurrently.
 - 4. Limit deflection of treads, platforms, and framing members to L/240 typical; L/360 for precast treads; or 1/4 inch, whichever is less.

- C. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 METAL STAIRS, GENERAL

- A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," Architectural class, unless more stringent requirements are indicated.

2.2 METALS

- A. Metal Surfaces: Refer to Division 5 requirements for Architecturally Exposed Structural Steel (AESS) for the surface requirements of steel used in fabrication of decorative metal stairs.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.
- C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- E. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.

2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Provide mechanically deposited or hot-dip, zinc-coated anchor bolts for stairs indicated to be shop primed with zinc-rich primer.
- D. Post-Installed Anchors: Chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099123 "Interior Painting."
- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 PRECAST CONCRETE TREADS AND LANDINGS

- A. Refer to Section 03 48 13 "Precast Concrete Stair Treads."

2.6 FABRICATION, GENERAL

- A. Fabricate and erect decorative metal stairs in accordance with Architecturally Exposed Structural Steel (AESS) standards, in addition to the requirements within this Section.
- B. Provide complete stair assemblies, including metal framing, hangers, struts, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work with accurate angles and surfaces and straight edges.
- F. Weld connections 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 to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds (no evidence of a welded joint).
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

2.7 STEEL-FRAMED STAIRS

- A. Stair Framing:
 - 1. Fabricate carrying beam of steel plates, channels or tubes.
 - a. Provide closures for exposed ends.
 - 2. Construct platforms of steel plate or channel headers and miscellaneous framing members as indicated.
 - 3. Weld stringers to headers; weld framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.
- B. Subtreads, Risers, and Subplatforms:
 - 1. Fabricate subtreads and subplatforms of steel plates.
 - 2. Weld subtreads to carrying beam. Locate welds on top of subtreads where they will be concealed by finished treads.
 - 3. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.
 - 4. Risers: Perforated steel steel plate minimum 1/4-inch thick and supported full perimeter; perforated design to be provided by Architect.

2.8 FINISHES

- A. Finish metal stairs after assembly.

- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- C. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting.
- D. Finish: High performance field-spray-applied fluoropolymer coating or high performance thermoset automotive grade finish.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- F. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.
- G. Install precast concrete treads with adhesive and anchors supplied by manufacturer.

END OF SECTION

SECTION 05 73 13 - GLAZED DECORATIVE METAL RAILINGS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes glass baluster type railings.

1.2 DEFINITIONS

- A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas and for pedestrian guidance and support, visual separation, or wall protection.

1.3 COORDINATION AND SCHEDULING

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Manufacturer's product lines of railings assembled from standard components.
 - 2. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, and attachment details.
- C. Samples for Verification: For each type of exposed finish required.
 - 1. Sections of each distinctly different linear railing member, including handrails and top rails.
 - 2. Each type of glass required.
 - 3. Fittings and brackets.
 - 4. Assembled Samples of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.
- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Engineered Systems: Engage a qualified professional engineer licensed in the State of Maryland, to engineer railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft. .
 - b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior railings by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.3 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:
 - 1. Accent Architectural.
 - 2. C. R. Laurence.
 - 3. Morse Industries.
 - 4. VIVA Railings.

2.4 STAINLESS STEEL

- A. Tubing: ASTM A 554, Grade MT 304.
- B. Pipe: ASTM A 312/A 312M, Grade TP 304.
- C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
- D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.
- E. Bars and Shapes: ASTM A 276, Type 304.

2.5 ALUMINUM

- A. Base Sections: 6063-T5 alloy and temper; base cladding to be formed stainless steel sheet.

2.6 GLASS AND GLAZING MATERIALS

- A. Safety Glazing: Glazing shall comply with 16 CFR 1201, Category II.

- B. Laminated Glass: ASTM C 1172, Condition A (uncoated), Type I (transparent flat glass), Quality-Q3 with two plies of glass ionoplast interlayer not less than 0.060 inch thick. Refer to Section 08 80 00 for additional requirements
 - 1. Glass Color: Clear.
 - 2. Interlayer Color: Clear.
 - 3. Glass Plies for Glass Infill Panels: Thickness required by structural loads, but not less than 3.0 mm each unless otherwise shown on Drawings.
- C. Safety Glazing Labeling: Permanently mark glass with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- D. Glazing Cement and Accessories for Structural Glazing: Glazing cement, setting blocks, shims, and related accessories as recommended or supplied by railing manufacturer for installing structural glazing in metal subrails.
 - 1. Glazing Cement: Nonshrinking organic cement designed for curing by passing an electric current through metal subrail holding glass panel, as standard with manufacturer.

2.7 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. Dissimilar Metals: Type 316 stainless-steel fasteners.
- B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless exposed fasteners are unavoidable.
 - 1. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.

2.8 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

- G. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- H. Form changes in direction as follows:
 - 1. By bending unless otherwise indicated on Drawings.
- I. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- J. Close exposed ends of hollow railing members with prefabricated end fittings.
- K. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work where indicated.
- L. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.9 GLAZING PANEL FABRICATION

- A. General: Fabricate to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.
 - 1. Clean-cut or flat-grind edges at butt-glazed sealant joints to produce square edges with slight chamfers at junctions of edges and faces.
 - 2. Grind smooth exposed edges, including those at open joints, to produce square edges with slight chamfers at junctions of edges and faces.

2.10 GENERAL FINISH REQUIREMENTS

- A. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.11 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.12 ALUMINUM FINISHES

- A. Class 1 Clear Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Perform anodizing following fabrication of longest practicable railing length; railing sections from pre-anodized material is not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet .
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 INSTALLING GLASS PANELS

- A. Glass-Supported Railings: Install assembly to comply with railing manufacturer's written instructions.
1. Attach base channel to building structure, then insert and connect factory-fabricated and -assembled glass panels.
 2. Attach base channel to building structure, then insert glass into base channel and bond with glazing cement.
 - a. Support glass panels in base channel at quarter points with channel-shaped setting blocks that also act as shims to maintain uniform space for glazing cement. Fill remaining space in base channel with glazing cement for uniform support of glass.
 3. Adjust spacing of glass panels so gaps between panels are equal before securing in position.
 4. Erect glass railings under direct supervision of manufacturer's authorized technical personnel.

3.3 CLEANING

- A. Clean and polish as recommended in writing by manufacturer. Wash both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion.

3.4 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

SECTION 05 73 14 - DECORATIVE METAL RAILINGS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes:
 - 1. Framed wire cable mesh infill.
 - 2. Stainless steel fittings to attach wire cable mesh panels to shop fabricated steel posts and railing system specified under Section 05 52 13; as detailed on Drawings.
 - 3. Stainless steel handrail brackets for the railing system incorporating the wire cable mesh infill panels; stainless steel railing as specified in Section 05 52 13.
 - 4. Engineered, component-based, draft curtain system; extruded aluminum hanger base with tempered glass.

1.2 DESIGN REQUIREMENTS

- A. Railing assemblies and attachments shall be designed, fabricated, and installed in accordance with applicable building codes to support:
 - 1. 200 pounds concentrated loading applied at any point in any direction.
 - 2. 50 pounds per linear foot uniform load applied horizontally to top of rail.
- B. Railing assemblies shall be designed to be prefabricated in modular components as required for shipping and to be assembled on site with concealed mechanical connections without welding.
- C. Railings shall be designed and fabricated with required joints to accommodate expansion and contraction of metal components without causing undue stress, buckling, opening of joints, and distortion.

1.3 SUBMITTALS

- A. Provide in accordance with Submittal Procedures:
 - 1. Structural computations or test data / evaluations, material properties and other information needed to ensure satisfactory structural compliance to applicable building codes, prepared by a Professional Engineer licensed in the State of Maryland.
 - 2. Product data for railing components and accessories.
 - 3. Shop drawings showing railing plans, elevations, dimensions, and installation details; shop drawings to be signed and sealed by Professional Engineer.
 - 4. Samples of manufacturer's finishes.
 - 5. Installation and maintenance instructions.

1.4 QUALITY ASSURANCE

- A. Comply with Consumer Product Safety Commission 16 CFR 1201 and other applicable safety requirements.
- B. Conform to applicable code for design and installation requirements for railing.
- C. Install the system with manufacturer's trained installers or an installer acceptable to the manufacturer.

1.5 HANDLING

- A. After fabrication, provide protective PVC film on handrails, posts, and other exposed to view components to be removed after installation.
- B. Exercise care not to scratch, mark, dent, or bend metal components during delivery, storage, or installation.

PART 2 PRODUCTS

2.1 AVAILABLE COMPONENT MANUFACTURERS

- A. C.R. Laurence Co.
- B. HDI Railing Systems.
- C. Inline Design
- D. Morse Industries.
- E. VIVA Railings.

2.2 COMPONENTS

- A. Material: Stainless steel grade AISI Type 316.
- B. Fastening bolts to be stainless steel or other high strength material as determined by engineering requirements with capability to sustain, without failure, load imposed within an appropriate safety factor for the specified material, such as steel anchors or concrete.
- C. Woven Cable Infill Mesh Panels:
 - 1. Assembled Infill Panel Frames with Mesh - Basis-of-Design: Jakob Rope Systems Webnet Rahmen CLASSIC.
 - 2. Material: Stainless steel, AISI 316L; wire rope diameter 1.5mm spaced with offset sleeves.
 - 3. Horizontal mesh (standard) with offset sleeves positioned horizontally.
 - 4. Aperture opening 75 - 80mm measured vertically.
 - 5. Panel frame 5/8" (16mm) diameter with mitered corners Type 304 or Type 316.
 - 6. Woven cable mesh panels attached to posts with standard attachments.
- D. Stainless steel fittings to attach wire cable mesh panels to shop fabricated steel posts: A version of the handrail bracket specified below, without flanges or saddles; or similar to C.R. Laurence Co. product HR2FPBS.
- E. Stainless steel handrail brackets for the railing system incorporating the wire cable mesh infill panels:
 - 1. Basis-of-Design: Inline Design; Handrail Wall Bracket Square Adjustable HBWA.017 with saddle for round handrail, modified with flange oriented vertically.
- F. Smoke Baffle Hanger Shoe Base:
 - 1. Livers Bronze Company; SMOKE BAFFLE.
 - 2. CRL-Blumcraft SB200 Series Smoke Baffle System.
 - 3. Dorma.
 - 4. Or equivalent of named railing manufacturers within this Section.

2.3 FABRICATION

- A. Fabricate railing system for compliance with structural requirements of applicable code.

2.4 FITTINGS

- A. Provide end caps, elbows, angles, tees, radiuses, wall returns, collars, wall, floor flanges, and other flush fittings as required for connecting, joining, and anchoring tubular metal railing components. Fittings to be stainless steel.
- B. Mitered corners: Fabricate from same metal and finish as rails to angles required for design indicated on Drawings. Diameter to match rail.

2.5 ACCESSORIES

- A. Supply fasteners and other components required for complete installation.

2.6 GENERAL FABRICATION

- A. Field verify railing dimensions prior to fabrication.
- B. Fabricate to designs indicated on Drawings and to meet performance requirements specified.
- C. Fabricate interfacing parts and assemblies so that field cutting adjustments are not necessary.
- D. Make exposed joints butt, flush, and hairline.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install components plumb and level, accurately fitted, and free from distortion and defects.

3.2 CLEANING

- A. Clean immediately following installation. Remove adhesives and other installation materials from adjacent finished surfaces.
- B. Remove protective films from metal surfaces.
- C. Clean railing surfaces using clean water and mild detergent. Do not use abrasive agent, steel wool, or harsh chemicals. Rinse with clean water.
- D. Protect installed railings from other construction operations.

END OF SECTION

SECTION 06 10 00 - ROUGH CARPENTRY**PART 1 GENERAL****1.1 SECTION INCLUDES**

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

1.2 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2016.
- E. PS 1 - Structural Plywood; 2009.
- F. PS 20 - American Softwood Lumber Standard; 2015.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For certified wood: Documentation indicating percentage new wood, percentage FSC and Chain-of-Custody (CoC) certificates indicating compliance with forest certification requirements. Include vendor invoice indicating FSC CoC.
 - 2. MR Credit 4: BPDO - Material Ingredients
 - a. For treated wood: Material Ingredient Report.
 - 3. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives, sealants and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
 - b. For composite wood installed within the building interior: Documentation indicating compliance with California Air Resources Board (CARB) Airborne Toxic Control Measures (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

1.4 QUALITY ASSURANCE

- A. Forest Certification: Provide wood products made from forests certified by an FSC-accredited certification body.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.
- C. Interior wet-applied adhesives, sealants, and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
- D. Composite wood installed within the building interior: Comply with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or contain no added formaldehyde resins.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

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

2.3 CONSTRUCTION PANELS

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

2.4 ACCESSORIES

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

2.5 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.

2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Fire Retardant Treatment:
1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat all exterior rough carpentry items.
 - c. Do not use treated wood in direct contact with the ground.
 - d. Treat wood blocking installed in built-up thickness for roofing terminations except top layer in direct contact with roofing membrane.
 - e. Basis-of-Design: Hoover-X by Hoover Treated Wood Products, Inc.:
www.frtw.com.
 2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat rough carpentry items as indicated .
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 2. Treat lumber in contact with roofing, flashing, or waterproofing.
 3. Treat lumber in contact with masonry or concrete.
 4. Treat lumber less than 18 inches above grade.
 5. Treat lumber in other locations as indicated.
 6. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
 - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - b. Treat plywood in contact with roofing, flashing, or waterproofing.
 - c. Treat plywood in contact with masonry or concrete.
 - d. Treat plywood less than 18 inches above grade.
 - e. Treat plywood in other locations as indicated.
- D. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative.
1. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

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

3.2 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

3.3 INSTALLATION OF CONSTRUCTION PANELS

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

END OF SECTION

SECTION 06 20 00 - FINISH CARPENTRY**PART 1 GENERAL****1.1 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.
- D. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- E. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.
- F. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2016.
- G. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- H. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; 2011.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide data on fire retardant treatment materials and application instructions.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.
- D. Samples: Submit two samples of finish plywood, 24- by 24 inch in size illustrating wood grain and specified finish.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For composite wood: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content composite wood: Documentation indicating percentages by weight pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For certified wood: Documentation indicating percentage new wood, percentage FSC and Chain-of-Custody (CoC) certificates indicating compliance with forest certification requirements. Include vendor invoice indicating FSC CoC.
 - 3. MR Credit 4: BPDO - Material Ingredients
 - a. For composite wood: Material Ingredient Report.
 - 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives, sealants, coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
 - b. For composite wood installed within the building interior: Documentation indicating compliance with California Air Resources Board (CARB) Airborne Toxic Control

Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom grade.
- B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
- C. Forest Certification: Provide wood products made from forests certified by an FSC-accredited certification body. All non-FSC wood in assemblies with FSC-certified wood shall meet the FSC Controlled Wood (CW) criteria.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire retardant requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.

1.6 PROJECT CONDITIONS

- A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.1 FINISH CARPENTRY ITEMS

- A. Recycled Content: Provide particleboard and MDF with minimum 80 percent recycled content.
- B. Interior wet-applied adhesives, sealants, and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
- C. Composite wood installed within the building interior: Comply with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

2.2 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.

2.3 LUMBER MATERIALS

- A. Hardwood Lumber: Maple species, plain sawn, maximum moisture content of 6 percent, of quality suitable for transparent finish.
 - 1. Grading: In accordance with NHLA G-101 Grading Rules; www.nhla.org.

2.4 SHEET MATERIALS

- A. Hardwood Plywood: HPVA HP-1, Grade AA, Type II; Veneer core, type of glue recommended for application; Maple face species, rotary cut.

2.5 PLASTIC LAMINATE MATERIALS

- A. Plastic Laminate: NEMA LD 3, HGS; textured, low gloss finish.
- B. Laminate Backing Sheet: NEMA LD 3, BKL; undecorated plastic laminate.

- C. Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.

2.6 ADHESIVE

- A. Adhesive: Type recommended by laminate manufacturer to suit application .

2.7 ACCESSORIES

- A. Wood Filler: Solvent base, tinted to match surface finish color.

2.8 WOOD TREATMENT

- A. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
- B. Wood Preservative by Pressure Treatment (PT Type): AWWPA Treatment C2 using water borne preservative with 0.25 percent retainage.
- C. Provide identification on fire retardant treated material.
- D. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
- E. Redry wood after pressure treatment to maximum 19 percent moisture content.

2.9 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.
- C. Cap exposed plastic laminate finish edges with 3mm polyvinylchloride (PVC), machine applied with hot melt adhesive, inside/outside length radiused, corner radiused and buffed.
 - 1. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.
- D. Shop prepare and identify components for book match grain matching during site erection.
- E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- F. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- G. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

2.10 SHOP FINISHING

- A. Apply wood filler in exposed nail and screw indentations.
- B. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- C. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent: Conversion varnish (formerly TR-4).
 - 2. Opaque: Catalyzed polyurethane (formerly OP-6).
- D. Back prime woodwork items to be field finished, prior to installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.

3.2 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.3 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06 41 00 - ARCHITECTURAL WOOD CASEWORK**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Specially fabricated cabinet units.
- B. Hardware.
- C. Factory finishing.

1.2 DEFINITIONS

- A. Work of this Section is typically referred as "Millwork" on the Drawings.

1.3 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.
- C. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- D. ANSI A208.1 - American National Standard for Particleboard; 2009.
- E. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.
- F. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- G. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- H. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; Hardwood Plywood & Veneer Association; 2009 (ANSI/HPVA HP-1).
- I. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.
- J. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2011.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet and shelf unit substrate and finish.
- E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- F. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For composite wood: Product-specific declaration or Industry-wide EPD or product-specific EPD.

2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content composite wood: Documentation indicating percentages by weight pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For certified wood: Documentation indicating percentage new wood, percentage FSC and Chain-of-Custody (CoC) certificates indicating compliance with forest certification requirements. Include vendor invoice indicating FSC CoC.
3. MR Credit 4: BPDO - Material Ingredients
 - a. For composite wood: Material Ingredient Report.
4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives, sealants, coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
 - b. For composite wood installed within the building interior: Documentation indicating compliance with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

1.5 QUALITY ASSURANCE

- A. Perform cabinet construction in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated as follows:
 1. All Cabinets: Premium quality.
- B. Forest Certification: Provide wood products made from forests certified by an FSC-accredited certification body. All non-FSC wood in assemblies with FSC-certified wood shall meet the FSC Controlled Wood (CW) criteria.

1.6 PRE-INSTALLATION MEETING

- A. Convene not less than one week before starting work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

1.8 FIELD CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.1 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Recycled Content: Provide particleboard and MDF with minimum 80 percent recycled content.
- C. Interior wet-applied adhesives, sealants, and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
- D. Composite wood installed within the building interior: Comply with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

2.2 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Recycled Content: Provide particleboard and MDF with minimum 80 percent recycled content.
- C. Composite wood installed within the building interior: Comply with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

2.3 LUMBER MATERIALS

- A. Hardwood Lumber: NHLA; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as follows:
 - 1. Exposed Surfaces: Species Maple.

2.4 PANEL MATERIALS

- A. Veneer Faced Plywood Finish: HPVA HP-1; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, core of particleboard, medium density fiberboard, strawboard, or engineered combination of core materials listed; type of glue recommended for specific application; thickness as required; face veneer as follows:
 - 1. Exposed Surfaces: Grade AA, Maple, rotary cut, book-matched.
- B. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.
 - 1. Density: 47-pound density or as required by the referenced standard, whichever is the more stringent.
- C. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.
 - 1. Use as backing for plastic laminate unless otherwise indicated.
- D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (S2S); use for drawer bottoms, dust panels, and other components indicated on drawings.
- E. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

2.5 LAMINATE MATERIALS

- A. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications and as follows:
 - 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through colorthrough color,.
 - 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through colorthrough color,.
 - 3. Cabinet Liner: CLS, 0.020 inch nominal thickness, through colorthrough color,.
 - 4. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.
- B. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As selected by Architect from laminate manufacturer's full range in solid colors, wood grains, and patterns, in matte finish.
 - 2. Ten different colors may be selected by Architect for this Project.

2.6 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Interior wet-applied adhesives, sealants, and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
- C. Edges:
 - 1. Cabinet body leading edges and drawer box edging shall be flat edge 0.020 inch (0.51mm) polyvinylchloride (PVC), machine applied with hot melt adhesive.
 - 2. Doors and drawer edges and front and rear shelf edges shall be edged with 3mm polyvinylchloride (PVC), machine applied with hot melt adhesive, inside/outside length radiused, corner radiused and buffed.
 - 3. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.
- D. Fasteners: Size and type to suit application.
- E. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- F. Grommets for Cable Passage through Countertops: 2-1/2 inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Product: Subject to compliance with requirements, provide "EDP series" by Doug Mockett and Co., Inc. or comparable product of Richelieu or Hafele.
 - 2. Coordinate color with countertop; provide white with white countertops; black color elsewhere.

2.7 HARDWARE

- A. Hardware Standard: Hinges, pulls, catches, drawer slides, locks and latches for millwork cabinetry, to be match to hardware included under Division 12 casework section; hardware finishes to match hardware included under the Division 12 casework section.
- B. Adjustable Shelf Standards and Supports - Utility, Supply and Concealed Locations:
 - 1. BHMA A156.9, B04071; with shelf rests, B04081 for end-mounted cabinet shelving, equivalent to No. 255-256 by Knape and Vogt Manufacturing Co.
 - 2. BHMA A156.9, B04102; with shelf brackets, B04112 for back-mounted wall shelving, equivalent to the following:
 - a. Extra Heavy-duty:
 - 1) No. 85-185, Double-Slot by Knape and Vogt Manufacturing Co.
 - 2) Universal Line by REEVE Store Equipment Co.
 - 3) CRL Series by C.R. Laurence Co. Inc.
- C. Shelf Standards and Brackets - Exposed: Continuous slotted extruded aluminum standard; surface-mounted.
 - 1. Acceptable Product: RAKKS C-Standard by Rangine Corporation; T-Style Lab Support Bracket or angle bracket.
 - a. Load Capacity: 100 pounds per bracket.
 - b. Lengths: As indicated on Drawings.
 - c. Material: Extruded aluminum.
 - d. Bracket Quantity: As indicated on Drawings; provide one additional set of brackets for every five sets of brackets or portion thereof.

- D. Piano Hinges:
 - 1. Material: Steel; polished nickel finish.
 - 2. Open Width: 2 inches.
 - 3. Gage: Minimum 0.04 inch.
 - 4. Pin Diameter: Minimum 0.09 inch.
 - 5. Basis-of-Design product Model 351.09.643 by Hafele.
- E. Surface-mounted "Rakks" Counter Brackets: L-shaped bracket fabricated from aluminum T sections; Model No. EH-1818 and EH-1824 as manufactured by Rangine Corporation.
 - 1. Load capacity per bracket: 450 pounds.
 - 2. Finish: Custom powder paint coating.
 - 3. Provide with 5/8 inch opening rubber grommet installed in 7/8 inch hole.
 - 4. Other Acceptable Products:
 - a. Federal Brace; engineered steel bracket of matching design and shop-applied custom powder paint coating.
 - b. Custom fabrication engineered of matching design in steel or aluminum, with architectural finished welding; shop-applied custom powder paint coating.

2.8 FABRICATION

- A. Cabinet Style: Flush overlay.
- B. Cabinet Doors and Drawer Fronts: Flush style.
- C. Drawer Construction Technique: Dovetail joints.
- D. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- E. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- F. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- G. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 - 2. Cap exposed plastic laminate finish edges with polyvinylchloride (PVC), machine applied with hot melt adhesive.

2.9 FACTORY FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.
- C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
- D. Finish work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1500, As scheduled.
- E. Match materials and finish of adjacent panels or frame when providing fillers in the final installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.

3.2 INSTALLATION

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinets to floor using appropriate angles and anchorages.

3.3 ADJUSTING

- A. Adjust installed work.

3.4 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 06 42 00 - WOOD PANELING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Plastic-laminate-faced wood paneling (decorative laminate surfacing).
- B. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced wood paneling unless concealed within other construction before paneling installation.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on fire retardant treatment materials and application instructions.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
 - 2. Provide plan of panel number sequencing.
- D. Samples for initial selection for high-pressure decorative laminates.
- E. Samples for verification for plastic laminates, 12 by 12 inches (300 by 300 mm), for each type, color, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- G. Evaluation Reports: For fire-retardant-treated materials and fire-retardant-treated paneling, from ICC-ES.
- H. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For composite wood: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content composite wood: Documentation indicating percentages by weight pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For certified wood: Documentation indicating percentage new wood, percentage FSC and Chain-of-Custody (CoC) certificates indicating compliance with forest certification requirements. Include vendor invoice indicating FSC CoC.
 - 3. MR Credit 4: BPDO - Material Ingredients
 - a. For composite wood: Material Ingredient Report.
 - 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives, sealants, coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
 - b. For composite wood installed within the building interior: Documentation indicating compliance with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
 - 1. Single Source Responsibility: Provide and install this work from single fabricator.
- B. Forest Certification: Provide wood products made from forests certified by an FSC-accredited certification body. All non-FSC wood in assemblies with FSC-certified wood shall meet the FSC Controlled Wood (CW) criteria.
- C. Quality Certification:
 - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
 - 2. Provide designated labels on shop drawings as required by certification program.
 - 3. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
 - 4. Arrange and pay for inspections required for certification.
 - 5. Replace, repair, or rework all work for which certification is refused.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire retardant requirements.

1.5 MOCK-UP

- A. Construct mock-up, illustrating full panel sheet, edge trim, joint trim and finish.
- B. Locate where directed.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.
- B. Do not deliver wood materials to project site until building is fully enclosed and interior temperature and humidity are in accordance with recommendations of AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

PART 2 PRODUCTS

2.1 PANELING

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless otherwise indicated.

2.2 WOOD-BASED MATERIALS - GENERAL

- A. Wood fabricated from old growth timber is not permitted.
- B. Recycled Content: Provide particleboard and MDF with minimum 80 percent recycled content.
- C. Composite wood installed within the building interior: Comply with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.
- D. Wood Moisture Content: 5 to 10 percent.
- E. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
- F. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
- G. Recycled Content of Medium-Density Fiberboard and Particleboard: Postconsumer recycled content and preconsumer recycled content.

- H. Lumber: Maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

2.3 ADHESIVES AND FASTENERS

- A. Interior wet-applied adhesives, sealants, and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."

2.4 WOOD TREATMENT PROCESSES

- A. Provide UL approved identification on fire retardant treated material.
- B. Fire-Retardant-Treated Paneling: Panels shall consist of fire-retardant plastic laminate and fire-retardant particleboard or fire-retardant, medium-density fiberboard. Panels shall have a flame-spread index of 25 or less and a smoke-developed index of 450 or less per ASTM E 84 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
1. Use treated materials that comply with requirements of referenced woodworking standard. Do not use materials that are warped, discolored, or otherwise defective.
 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- C. Fire-Retardant Particleboard - Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:
1. Flakeboard Company Limited; Duraflake FR.
 2. SierraPine; Encore FR.

2.5 PLASTIC-LAMINATE-FACED WOOD PANELING

- A. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3 and the following requirements:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:
 - a. Formica Corporation.
 - b. Lamin-Art, Inc.
 - c. Panolam Industries International Incorporated.
 - d. Wilsonart International.
 2. Faces: Grade HGF Grade VGF.
 3. Backs: Grade BKL.
 4. Exposed Edges: Same as faces.
- B. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed surfaces complying with the following requirements:
1. As indicated by manufacturer's designations.
 2. Match Architect's samples.
 3. Grain Direction: Vertical.
- C. Panel Core: Fire-retardant particleboard or fire-retardant, medium-density fiberboard.
1. Thickness: As indicated.
- D. Exposed Panel Edges: 1mm PVC; selection to match plastic laminate face.
- E. Panel Reveals: Apply substrate to location.

- F. Adhesives for Bonding Plastic Laminate: Unpigmented contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.
- G. Assemble panels by gluing and concealed fastening.

2.6 FABRICATION

- A. Prepare panels for delivery to site, permitting passage through building openings.
- B. Finish exposed edges of panels as specified by grade requirements.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting and scribing.

2.7 ACCESSORIES

- A. Back-Mounting Accessories: Standard accessories for concealed support, designed to allow panel removal, and as follows:
 - 1. Two-part clip and base-support bracket system; brackets designed to support full weight of panels and clips designed for lateral support, with one part mechanically attached to back of panel and the other attached to substrate.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated on shop drawings.
- B. Verify adequacy of backing and support framing.
- C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Do not begin installation until wood materials have been fully acclimated to interior conditions.
- C. Set and secure materials and components in place, plumb and level, using concealed fasteners wherever possible.

3.3 PREPARATION FOR FIELD FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Field Finishing: Refer to Section 09 93 00.

3.4 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 07 13 00 - SHEET WATERPROOFING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Sheet Waterproofing:
- B. Accessories.
- C. Drainage panels.

1.2 REFERENCE STANDARDS

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).
- B. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).
- C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- D. NRCA (WM) - The NRCA Waterproofing Manual; 2005.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for membrane.
- C. LEED Submittals: Comply with Section 018113.
- D. MR Credit 4: BPDO - Material Ingredients
 - 1. For waterproofing, if applicable: Material Ingredient Report.
- E. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- F. Certificate: Certify that products meet or exceed specified requirements.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Membrane Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.5 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

- C. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Carlisle Coatings & Waterproofing Inc.; Product CCW MiraDRI 860/861.
- B. GCP Advanced Technologies Construction Products; Bituthene 3000/Low Temperature or Bituthene 4000.
- C. Henry Company; Blueskin WP 100/200.
- D. Polyguard Products, Inc.; Polyguard 650.
- E. Soprema; Colphene 3000.
- F. W. R. Meadows; MEL-ROL.

2.2 APPLICATIONS

- A. Waterproof for building surfaces:
 - 1. Exterior face of foundation/building walls where finished grade is above finished floor elevation; waterproofing installed from top of footing to finished grade elevation.
 - 2. Concealed vertical face of separation of stepped floor elevations.

2.3 MEMBRANE MATERIALS

- A. Composite Laminate Membrane: Comprised of 56 mils thickness of rubberized asphalt and a 4 mils thickness of polyethylene film with release liner on adhesive-side; 60 mils total thickness.
 - 1. Tensile Strength: 325 psi, measured in accordance with ASTM D 412.
 - 2. Water Absorption: 231 percent increase in weight, maximum, measured in accordance with ASTM D 570, 24 hour immersion.
 - 3. Water Vapor Permeability: 0.05 perm inch, measured in accordance with ASTM E 96/E 96M.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Sealant: As recommended by membrane manufacturer.
- D. Termination Bars: Aluminum; compatible with membrane and adhesives.

2.4 ACCESSORIES

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side with a polymeric film bonded to the other side of a studded, nonbiodegradable, molded-plastic-sheet drainage core, with a vertical flow rate of 9 to 15 gpm per ft.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify items that penetrate surfaces to receive waterproofing are securely installed.

3.2 PREPARATION

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D. Seal cracks and joints with sealant using depth to width ratio as recommended by sealant manufacturer.
- E. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

3.3 INSTALLATION - MEMBRANE

- A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- B. Roll out membrane, and minimize wrinkles and bubbles.
- C. Self-Adhering Membrane: Remove release paper layer, and roll out onto substrate with a mechanical roller to provide full contact bond.
- D. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
- E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- F. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.
- G. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
- H. Seal membrane and flashings to adjoining surfaces.

3.4 INSTALLATION - DRAINAGE PANEL

- A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.

END OF SECTION

SECTION 07 14 00 - FLUID-APPLIED WATERPROOFING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Fluid-Applied Waterproofing:
 - 1. Cold-applied modified-polymer elastomeric waterproofing.

1.2 REFERENCE STANDARDS

- A. ASTM D2370 - Standard Test Method for Tensile Properties of Organic Coatings; 2016.
- B. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- C. NRCA (WM) - The NRCA Waterproofing Manual; 2005.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for membrane, surface conditioner, and joint and crack sealants.
- C. Warranty:
 - 1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
 - 2. Submit installer's certification that installation complies with warranty conditions for the waterproofing membrane.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.5 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until cured for water based systems.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Contractor shall correct defective Work within a two year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no cost to Owner.
- C. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water.

PART 2 PRODUCTS**2.1 FLUID APPLIED WATERPROOFING MATERIALS**

- A. Cold-Applied Modified-Polymer Elastomeric Waterproofing:
 - 1. Cured Thickness: 45 mils, 0.045 inch, minimum.
 - 2. Suitable for installation over concrete and masonry substrates.
 - 3. Tensile Strength: 95 psi, measured in accordance with ASTM D2370.
 - 4. Ultimate Elongation: 350 percent, minimum, measured in accordance with ASTM D2370.

5. Water Vapor Permeability: 0.07 perm inch, maximum measured in accordance with ASTM E96/E96M.
 6. Solvent- and coal tar free.
 7. Products for Application Above 40 degrees F Surface Temperature and Rising:
 - a. Carlisle Coatings & Waterproofing, Inc; MiraSEAL: www.carlisleccw.com/#sle.
 - b. Henry Company; Henry CM100: www.henry.com/#sle.
 - c. Soprema; Colphene LM BARR: www.soprema.us.
 - d. Tremco Commercial Sealants and Waterproofing; TREMproof 250GC: www.tremcosealants.com.
 - e. W.R. Meadows, Inc; MEL-ROL LM: www.wrmeadows.com/#sle.
 8. Products for Application Below Temperatures Below 40 degrees F:
 - a. Henry Company; Henry CM100 (limited to 35 degrees F and rising): www.henry.com.
 - b. Soprema; Colphene LM BARR (limited to 35 degrees F and rising): www.soprema.us.
 - c. W.R. Meadows, Inc; MEL-ROL LM All Season: www.wrmeadows.com/#sle.
 9. Contractor and Manufacturer are accountable to ensure proper product selection for temperatures at time of installation, or providing the temporary measures for application acceptable to the particular manufacturer.
- B. Flexible Flashings: Type recommended by membrane manufacturer.
- C. Joint Cover Sheet: 1 inch thick elastic sheet material designated for and compatible with membrane.

2.2 ACCESSORIES

- A. Surface Conditioner: Liquid VOC-compliant type, compatible with membrane compound; as recommended by membrane manufacturer.
- B. Sealant for Joints and Cracks in Substrate: Type compatible with waterproofing material and as recommended by waterproofing manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.
- C. Verify that substrate surfaces are smooth, free of honeycomb or pitting, and not detrimental to full contact bond of waterproofing materials.
- D. Verify items that penetrate surfaces to receive waterproofing are securely installed.

3.2 PREPARATION

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- C. Do not apply waterproofing to surfaces unacceptable to waterproofing manufacturer.
- D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.

- E. Seal moving cracks with sealant and non-rigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- F. Prepare building expansion joints at locations as indicated on drawings.

3.3 INSTALLATION

- A. Install waterproofing to specified minimum thickness in accordance with manufacturers instructions and NRCA (WM) applicable requirements.
- B. Apply primer or surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.
- C. At joints and cracks less than 1/2 inch in width including joints between horizontal and vertical surfaces, apply 12 inch wide strip of joint cover sheet.
- D. At joints from 1/2 inch to 1 inch in width, loop joint cover sheet down into joint between 1-1/4 inch to 1-3/4 inch, and extend sheet at least 6 inches on either side of expansion joint.
- E. Center joint cover sheet over joints, roll sheet into 1/8 inch thick coating of waterproofing material and apply second coat over sheet extending at least 6 inches beyond sheet edges.
- F. Tie-in transition membranes for adjacent systems, as accepted by waterproofing and transition membrane manufacturer.
- G. Apply extra thickness of waterproofing material at corners, intersections, and angles.
- H. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
- I. Seal membrane and flashings to adjoining surfaces.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's representative must attend pre-installation meeting and inspect completed work prior to covering; may require multiple inspections as determined by Contractor's sequencing of work.

END OF SECTION

SECTION 07 16 16 - CRYSTALLINE WATERPROOFING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Crystalline waterproofing.

1.2 REFERENCE STANDARDS

- A. COE CRD-C 48 - Method of Test for Water Permeability of Concrete; 1992.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Test data showing hydraulic permeability.
 - 2. Details for waterproofing at joints, intersections, and other special conditions.
- B. Specimen warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of products of the type specified.
- B. Installer Qualifications: Acceptable to manufacturer, with documented experience on at least five projects of similar nature within last five years.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Take necessary precautions to keep cementitious materials dry.

1.6 FIELD 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. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide installer's warranty agreeing to correct leaking waterproofing for two years from Date of Substantial Completion, unless leakage is caused by structural failure, movement of the structure, or other causes beyond the installer's control.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Crystalline Waterproofing:
 - 1. Anti-Hydro International, Inc.; Hydro Cap.
 - 2. Conproco Corp.; Super Seal.
 - 3. Tamms Industries, Inc.; Hey'Di K-11.
 - 4. ThoRoc, Div. of ChemRex; Tegraproof.
 - 5. Tremco Incorporated; Permaquik Crystalline Waterproofing.
 - 6. Xypex Chemical Corporation; Xypex.

2.2 APPLICATIONS

- A. Waterproofing for Building Surfaces:
 - 1. Inside of elevator pits.

2.3 MATERIALS

- A. Crystalline Waterproofing: Portland cement and chemical compound that when applied to surface of concrete forms insoluble crystals in capillary pores preventing passage of liquids, while having no adverse effect on normal properties of concrete.
 - 1. Hydraulic Permeability: No measurable leakage or water flow at 200 psi pressure when tested in accordance with COE CRD-C 48, using minimum 2 inch thick sample and 20 days duration.
 - 2. Toxicity: Non-toxic.
 - 3. Color: Gray.
- B. Patching Compound: Ready-mixed cementitious mortar recommended or approved by waterproofing manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under project conditions, and use sand blasting, water blasting, or acid etching as recommended.
- C. Plug water leaks.
- D. Patch holes, construction joints, and cracks; remove defective concrete.
- E. Obtain approval of manufacturer's field representative before beginning installation.

3.2 INSTALLATION

- A. Install in strict accordance with manufacturer's instructions, maintain environmental conditions required and recommended by manufacturer, and keep a copy of manufacturer's instructions on site.
- B. Coordinate installation with installation of products that must penetrate waterproofed surfaces.
- C. Prevent excessive drying of surface.
 - 1. Cure waterproofing for at least three days, or length of time required by manufacturer, with water spray and adequate air circulation.
 - 2. Do not use chemical curing agents unless explicitly approved by waterproofing manufacturer.
- D. Do not backfill, fill water or liquid holding structures, or apply finish coatings until time period recommended by manufacturer has passed.

END OF SECTION

SECTION 07 18 00 - TRAFFIC COATINGS**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes traffic coatings for the elevated slab mechanical penthouse spaces as noted on the finish schedule.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. LEED Submittals: Comply with Section 018113.
1. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
- C. Shop Drawings: Show extent of each traffic coating. Include details for treating substrate joints and cracks, flashings, deck penetrations, and other termination conditions.
- D. Samples for Initial Selection: For each type of finish indicated.
- E. Qualification Data: For Installer.
- F. Material Test Reports: For each traffic coating.
- G. Material Certificates: For each traffic coating, signed by manufacturers.
- H. Field quality-control test reports.
- I. Maintenance Data: For traffic coatings to include in maintenance manuals. Identify substrates and types of traffic coatings applied. Include recommendations for periodic inspections, cleaning, care, maintenance, and repair of traffic coatings.
- J. Warranty: Special warranty specified in this Section.

1.3 PERFORMANCE REQUIREMENTS

- A. Base Membrane: VOC compliant, high adhesion, liquid polyurethane membrane and shall meet or exceed the following typical performance properties:

Property	Typical Value	ASTM Method
1. Composition	Aromatic Urethane	
2. Solids by Weight	85%	C 1250
3. Hardness, Shore A	63	D 2240
4. Tensile Strength	850 PSI	D 412
5. Ultimate Elongation	625%	D 412
6. Tear Resistance	140 lb/in	D 624
7. Adhesion to Concrete	23 PLI	D 903
8. Low Temp. Flexibility	-650F	D 522

- B. Traffic-Resistant Top Coat: VOC compliant, high tensile strength, abrasion-resistant and weather-resistant aliphatic elastomeric polyurethane and shall meet or exceed the following typical performance properties:

Property	Typical Value	ASTM Method
1. Composition	Aliphatic Urethane	
2. Solids by Weight	72%	C 1250
3. Hardness, Shore A	91	D 2240

4.	Tensile Strength	3200 PSI	D 412
5.	Ultimate Elongation	190%	D 412
6.	Tear Resistance, Die C	300 lb/in.	D 624
7.	Low Temp. Flexibility And Crack Bridging	Pass	C 957
8.	Weather Resistance	No Chalking at 2000 hrs.	G 53
9.	Water Permeability (system)	< 1.0 Perm	E 96 B
10.	Abrasion Resistance (system)	< 50 mg.	C 501

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of traffic coatings required for this Project.
- B. Source Limitations:
 - 1. Obtain traffic coatings from a single manufacturer.
 - 2. Obtain primary traffic coating materials, including primers, from traffic coating manufacturer. Obtain secondary materials including aggregates, sheet flashings, joint sealants, and substrate repair materials of type and from source recommended in writing by primary material manufacturer.
- C. Preinstallation Conference:
 - 1. Before installing traffic coatings, meet with representatives of authorities having jurisdiction, manufacturer's technical representative, Owner, Architect, consultants, independent testing agency, and other concerned entities. Review requirements for traffic coatings. Notify participants at least seven days before conference.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels showing the following information:
 - 1. Manufacturer's brand name.
 - 2. Type of material.
 - 3. Directions for storage.
 - 4. Date of manufacture and shelf life.
 - 5. Lot or batch number.
 - 6. Mixing and application instructions.
 - 7. Color.
- B. Store materials in a clean, dry location protected from exposure to direct sunlight. In storage areas, maintain environmental conditions within range recommended in writing by manufacturer.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Apply traffic coatings within the range of ambient and substrate temperatures recommended in writing by manufacturer. Do not apply traffic coatings to damp or wet substrates, when temperatures are below 40 deg F, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.
- B. Do not install traffic coating until items that will penetrate membrane have been installed.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which traffic coating manufacturer agrees to repair or replace traffic coatings that deteriorate during the specified warranty period. Warranty does not include deterioration or failure of traffic coating due to unusual phenomena,

failure of prepared and treated substrate, formation of new substrate cracks exceeding 1/16 inch in width, fire, vandalism, or abuse by maintenance equipment.

1. Deterioration of traffic coatings includes the following:
 - a. Adhesive or cohesive failures.
 - b. Abrasion or tearing failures.
 - c. Surface crazing or spalling.
 - d. Intrusion of water, oils, gasoline, grease, or acids into deck substrate.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Traffic Coatings: Complying with ASTM C 957.
- B. Material Compatibility: Provide primers; base, intermediate, and topcoats; and miscellaneous materials that are compatible with one another and with substrate under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- C. Interior wet-applied traffic coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."

2.2 TRAFFIC COATING

- A. Available Manufacturers: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 1. BASF Construction Chemicals, LLC - Building Systems; Product Conipur II: www.BuildingSystems.BASF.com.
 2. Neogard; Division of Jones-Blair; Product AUTO-GARD: www.neogard.com.
 3. Tremco Incorporated; an RPM company; Product Vulkem 350NF/950NF/951NF: www.tremcosealants.com.
- B. Primer: Manufacturer's standard factory-formulated primer recommended for substrate and conditions indicated.
 1. Material: Urethane.
- C. Preparatory and Base Coats: Single- or multicomponent, aromatic liquid urethane elastomer.
- D. Topcoat: Single- or multicomponent, aliphatic liquid urethane elastomer.
 1. Color: As selected by Architect from manufacturer's full range.
- E. Component Coat Thicknesses: As recommended by manufacturer for substrate and service conditions indicated, but not less than the following (measured excluding aggregate):
 1. Base Coat: 32 mils minimum wet film thickness.
 2. Top Coat: 16 mils minimum wet film thickness.
- F. Aggregate: Uniformly graded, washed silica sand of particle sizes, shape, and minimum hardness recommended in writing by traffic coating manufacturer.
 1. Spreading Rate: As recommended by manufacturer for substrate and service conditions indicated, but not less than the following:
 - a. Top Coat: 8 to 10 lb/100 sq. ft., follow with backroll to encapsulate the sand.

2.3 MISCELLANEOUS MATERIALS

- A. Joint Sealants: As specified in Division 7 Section "Joint Sealants."
- B. Sheet Flashing: Nonstaining.
 1. Minimum Thickness: 60 mils thickness.
 2. Material: Sheet material recommended in writing by traffic coating manufacturer.

- C. Adhesive: Contact adhesive recommended in writing by traffic coating manufacturer.
- D. Reinforcing Strip: Fiberglass mesh recommended in writing by traffic coating manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements and for other conditions affecting performance of traffic coatings.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 - 2. Verify compatibility with and suitability of substrates.
 - 3. Begin coating application only after minimum concrete curing and drying period recommended by traffic coating manufacturer has passed, after unsatisfactory conditions have been corrected, and after surfaces are dry.
 - 4. Verify that substrates are visibly dry and free of moisture.
 - a. Test for moisture vapor transmission by plastic sheet method according to ASTM D 4263.
 - b. Test for moisture content by method recommended in writing by manufacturer.
 - 5. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Clean and prepare substrates according to ASTM C 1127 and manufacturer's written recommendations to produce clean, dust-free, dry substrate for traffic coating application.
- B. Mask adjoining surfaces not receiving traffic coatings, deck drains, and other deck substrate penetrations to prevent spillage, leaking, and migration of coatings.
- C. Concrete Substrates: Mechanically abrade concrete surfaces to a uniform profile according to ASTM D 4259. Do not acid etch.
 - 1. Remove grease, oil, paints, and other penetrating contaminants from concrete.
 - 2. Remove concrete fins, ridges, and other projections.
 - 3. Remove laitance, glaze, efflorescence, curing compounds, concrete hardeners, form-release agents, and other incompatible materials that might affect coating adhesion.
 - 4. Remove remaining loose material to provide a sound surface, and clean surfaces according to ASTM D 4258.

3.3 TERMINATIONS AND PENETRATIONS

- A. Prepare vertical and horizontal surfaces at terminations and penetrations through traffic coatings and at expansion joints, drains, and sleeves according to ASTM C 1127 and manufacturer's written recommendations.
- B. Provide sealant cants at penetrations and at reinforced and nonreinforced, deck-to-wall butt joints.
- C. Terminate edges of deck-to-deck expansion joints with preparatory base-coat strip.
- D. Install sheet flashings at deck-to-wall expansion and dynamic joints, and bond to deck and wall substrates according to manufacturer's written recommendations.

3.4 JOINT AND CRACK TREATMENT

- A. Prepare, treat, rout, and fill joints and cracks in substrates according to ASTM C 1127 and manufacturer's written recommendations. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.
 - 1. Comply with recommendations in ASTM C 1193 for joint-sealant installation.

3.5 TRAFFIC COATING APPLICATION

- A. Apply traffic coating material according to ASTM C 1127 and manufacturer's written recommendations.
 - 1. Start traffic coating application in presence of manufacturer's technical representative.
 - 2. Verify that wet film thickness of each component coat complies with requirements every 100 sq. ft.
- B. Apply traffic coatings to prepared wall terminations and vertical surfaces to height indicated, and omit aggregate on vertical surfaces.
- C. Cure traffic coatings according to manufacturer's written recommendations. Prevent contamination and damage during application and curing stages.

3.6 FIELD QUALITY CONTROL

- A. Testing: Engage a qualified testing agency to perform the following field tests and inspections and prepare test reports:
 - 1. Testing agency shall verify thickness of coatings during traffic coating application.
 - 2. If test results show traffic coating materials do not comply with requirements, prepare surfaces and reapply traffic coatings.
- B. Final Traffic Coating Inspection: Arrange for traffic coating manufacturer's technical personnel to inspect membrane installation on completion.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 PROTECTING AND CLEANING

- A. Protect traffic coatings from damage and wear during remainder of construction period.
- B. Clean spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 21 00 - THERMAL INSULATION**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Board insulation at perimeter foundation wall and underside of floor slabs.
- B. Batt insulation within stud cavity of exterior wall assemblies.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
- D. Foam expansion insulation.
- E. Refer to Section 07 21 13.53 for continuous insulation in exterior wall assemblies.

1.2 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2017a.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For insulation: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content insulation: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - 3. MR Credit 4: BPDO - Material Ingredients
 - a. For insulation: Material Ingredient Report.
 - 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives and sealants: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
 - b. For thermal and acoustic insulation installed within the building interior: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 or GREENGUARD Gold certification.

1.4 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.
- B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
- C. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.

2.2 GENERAL

- A. Recycled Content: Provide mineral wool insulation with minimum 75 percent recycled content; provide polystyrene insulation with minimum 20 percent recycled content; provide glass fiber insulation with minimum 20 percent recycled content.
- B. Interior wet-applied adhesives and sealants: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
- C. Thermal and acoustic insulation installed within the building interior: Comply with California Department of Public Health (CDPH) Standard Method v1.1-2010 or GREENGUARD Gold certification.

2.3 RIGID FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 3. R-value; 1 inch of material at 72 degrees F: 5, minimum.
 - 4. Board Edges: Square.
 - 5. Thermal Conductivity (k factor) at 25 degrees F: 0.18.
 - 6. Compressive Resistance: 15 psi at vertical applications; 40 psi at foundation perimeter.
 - 7. Board Density: 1.3 lb/cu ft.
 - 8. Water Absorption, Maximum: 0.3 percent, by volume.
 - 9. Manufacturers:
 - a. Dow Chemical Co: www.dow.com.
 - b. Owens Corning Corp: www.owenscorning.com.
 - c. Kingspan Insulation LLC; www.trustgreenguard.com.

2.4 BATT INSULATION MATERIALS

- A. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
 - 1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
 - 2. Manufacturers:
 - a. Knauf Insulation: www.knaufinsulation.com.
 - b. ROCKWOOL (ROXUL, Inc): www.rockwool.com.
 - 1) Within Stud Cavity of Exterior Wall Assemblies - Basis-of-Design: COMFORTBATT.
 - (a) Submission of Comparable Product of another named manufacturer must include an energy study and dew point calculation, demonstrating equivalent or better thermal performance without risk of condensation.
 - 2) Interior Partitions Acoustical Insulation - Basis-of-Design: AFB evo; no added formaldehyde.
 - c. Thermafiber, Inc: www.thermafiber.com.

- B. Batt Insulation: ASTM C 665; preformed batt; friction fit, conforming to the following:
 - 1. Applications: Filling miscellaneous gaps and crevices; or within sound barriers.
 - 2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
 - 3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
 - 4. Combustibility: Non-combustible, when tested in accordance with ASTM E 136.
 - 5. Manufacturers:
 - a. CertainTeed Corporation: www.certainteed.com.
 - b. Johns Manville Corporation: www.jm.com.
 - c. Knauf Insulation: www.knaufusa.com
 - d. Owens Corning Corp: www.owenscorning.com.
 - 6. Unfaced Batt Insulation: ASTM C 665, Type I.
- C. Sustainability Requirements: Provide glass-fiber insulation as follows:
 - 1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
 - 2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

2.5 FOAM EXPANSION INSULATION

- A. Insulation for voids, cavities and irregularly shaped areas: Medium expansion polyurethane foam.
- B. Type: Low pressure (less than 2 psig) closed-cell polyurethane; manufactured to ASTM E-84, Class 1 fire-rated specifications.
- C. Characteristics: Made with renewable foaming materials, contains no formaldehyde, plumbing safe, water resistant, and safe around approved electrical insulations.
- D. Available manufacturers include Tiger Foam Insulation, Hilti, Versi-Foam Systems, or equivalent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
- B. Install boards horizontally on foundation perimeter.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.3 BOARD INSTALLATION UNDER CONCRETE SLABS

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.4 BATT INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

3.5 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 21 13.53 - CAVITY AND RAINSCREEN WALL INSULATION**PART 1 - GENERAL****1.1 SUMMARY OF WORK**

- A. This Section specifies stone/mineral fiber board insulation continuous insulation in exterior wall assemblies.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene pre-installation meeting before starting work of this section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written installation instructions.
1. Comply with Division 1 requirements and co-ordinate with other similar pre-installation meetings.
 2. Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
 - a. Owner.
 - b. Consultant.
 - c. Contractor.
 - d. Board insulation installation subcontractor.
 - e. Manufacturer's technical representative.
 - f. Ensure meeting agenda includes review of methods and procedures related to insulation installation including co-ordination with related work.
 - g. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

1.3 SUBMITTALS

- A. Product Data: Submit product data including manufacturer's literature for insulation materials and accessories, indicating compliance with specified requirements and material characteristics.
1. Submit list on insulation manufacturer's letterhead of materials and accessories to be incorporated into Work.
 2. Include product name.
 3. Include preparation instructions and recommendations, installation methods, and storage and handling requirements.
 4. Include contact information for manufacturer and their representative for this Project.
- B. Certifications:
1. Provide insulation manufacturer's acceptance of masonry tie accessories to hold insulation to backup construction; do not use impaling pins at brick veneer locations.
 2. Provide letter of acceptance from air barrier manufacturer for compatibility of adhesives used in setting impaling pins, at metal wall panel locations.
- C. Shop Drawings: Prepare diagram of impaling pin locations at locations of metal wall panels on stud backup wall assemblies; receive acceptance of manufacturer.
- D. LEED Submittals: Comply with Section 018113.
1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For insulation: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 2. MR Credit 3: BPDO - Sourcing of Raw Materials

- a. For recycled content insulation: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
3. MR Credit 4: BPDO - Material Ingredients
 - a. For insulation: Material Ingredient Report.
4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives and sealants: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
 - b. For thermal and acoustic insulation installed within the building interior: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 or GREENGUARD Gold certification.
- E. Test Reports: Submit evaluation service reports or other independent testing agency reports showing compliance with specified performance characteristics and physical properties.
- F. Field Reports: Submit manufacturer's field reports for each manufacturer representative's site visit and inspection.
- G. Insulation Installer Qualifications:
 1. Submit letter verifying insulation installer's experience with work similar to work of this Section.

1.4 CLOSEOUT SUBMITTALS

- A. Record Documentation: In accordance with Section 017800 - Closeout Submittals.
 1. List materials used in insulation work.
 2. Warranty: Submit warranty documents specified.

1.5 QUALITY ASSURANCE

- A. Board Insulation Installer Quality Assurance: Use only installers with 5 years minimum experience with work similar to work of this Section.
- B. Source Quality Control: Ensure insulation components and accessories are supplied or approved in writing by single manufacturer.

1.6 DELIVERY STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Deliver materials and accessories in insulation manufacturer's original packaging with identification labels intact and in sizes to suit project.
 2. Ensure insulation materials are not exposed to moisture during delivery.
 3. Replace wet or damaged insulation materials.
 4. Storage and Handling Requirements: Store materials off ground in dry location and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 - a. Store in original packaging until installed.
 5. Packaging Waste Management:
 - a. Separate and recycle waste packaging materials in accordance with Section 017419 - Construction Waste Management and Disposal.
 - b. Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.
 6. Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling in accordance with Waste Management Plan.

1.7 WARRANTY

- A. Project Warranty: Refer to Contract Conditions for project warranty provisions.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Subject to compliance with the Construction Documents products of the following are subject for review:
 1. Thermafiber; RainBarrier 45.
 2. Roxul; CAVITYROCK.

2.2 DESCRIPTION

- A. Non-combustible, lightweight, water repellent, rigid insulation board with rigid upper surface to ASTM C612 Type IV.

2.3 PERFORMANCE CRITERIA

- A. Fire performance:
 1. Non-combustibility: ASTM E136.
 2. Maximum use temperature: 1382 degrees F.
 3. Surface Burning Characteristics: ASTM E84 (UL 723).
 - a. Flame spread: 0.
 - b. Smoke developed: 0.
- B. Thermal resistance - ASTM C518C177: R-value/inch at 75 degrees F 4.2 hr.ft².F/Btu or better.
- C. Water vapour permeance: 27 perm minimum.
- D. Moisture sorption: 0.1 percent maximum to ASTM C1104/C1104M.
- E. Fungi resistance: Zero mould growth to ASTM C1338.
- F. Corrosive resistance:
 1. Steel to ASTM C665: Pass.
 2. Stainless steel to ASTM C795: Conforms.
- G. Acoustical performance sound absorption co-efficients to ASTM C423.

2.4 MATERIALS

- A. Board Insulation: Non-combustible, lightweight, water repellent, rigid insulation board with rigid upper surface to ASTM C612 Type IV.
 1. Thickness: Refer to Drawings.
 2. Density:
 - a. Thicknesses 2" and below: 4.4 lb/ft³ to ASTM C303.
 - b. Thicknesses 2.5" and above:
 - 1) Outer layer: 6.24 lb/ft³ to ASTM C303.
 - 2) Inner layer: 3.75 lb/ft³ to ASTM C303.

2.5 ACCESSORIES

- A. Mechanical fasteners in accordance with insulation manufacturer's written recommendations.
 1. Impaling Pins: Provide self-adhering or type with base for adhering to face of air barrier.
 - a. Location: Metal wall panel locations only.
 - b. Compatibility: Receive approval of air barrier manufacturer for compatibility of adhesives with air barrier material.
- B. Insulation Clips: in accordance with manufacturer's written recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for insulation installation in accordance with manufacturer's written recommendations.
1. Visually inspect substrate in presence of Consultant.
 2. Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.
 3. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
 4. Start of insulation installation indicates installer's acceptance of substrate installation conditions.

3.2 INSTALLATION

- A. General:
1. Install insulation in accordance with manufacturer's written recommendations.
 2. Install insulation to maintain continuity of thermal protection to building elements and spaces.
 3. Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
 4. Keep insulation minimum 3 inches from heat emitting devices such as recessed light fixtures, and minimum 2 inches from sidewalls of vents.
 5. Do not enclose insulation until before inspection and receipt of Consultant's written approval.
- B. Installation of Insulation Board for Exterior Wall Assemblies:
1. Install insulation board in accordance with insulation manufacturer's written recommendations.
 2. Exterior Walls with Brick Veneer and Block or Concrete Backup: Insulation to be held tight to face of backup construction with masonry anchors or ties, with retaining washers designed for this purpose; refer to 04 20 00 for masonry veneer anchor and tie types.
 3. Exterior Walls with Stud Backup: Insulation to be held tight with impaling pins; number a placement of pins per panel as prescribed by insulation manufacturer.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Services:
1. Have manufacturer review work involved in handling, installation, protection, and cleaning of insulation and accessories, and submit written reports in acceptable format to verify compliance of Work with Contract conditions.
 2. Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product installation review in accordance with manufacturer's instructions.
 - a. Report any inconsistencies from manufacturer's recommendations immediately to Consultant.
 - b. Schedule site visits to review work at stages listed:
 - 1) After delivery and storage of drainage sheet and accessories, and when preparatory work on which Work of this Section depends is complete, but before installation begins.
 - 2) Twice during progress of work at 25 percent and 60 percent complete.
 - 3) Upon completion of Work, after cleaning is carried out.

- 4) Obtain reports within three days of review and submit immediately to Consultant.

3.4 CLEANING

- A. Progress Cleaning: Perform cleanup as work progresses; leave work area clean at end of each day.
- B. Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment.
- C. Waste Management:
 1. Co-ordinate recycling of waste materials with 017419 - Construction Waste Management and Disposal.
 2. Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
 3. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

- A. Protect installed products and accessories from damage during construction.
- B. Repair damage to adjacent materials caused by insulation installation.

END OF SECTION

SECTION 07 21 60 - STRUCTURAL THERMAL BREAK**PART 1 GENERAL****1.1 DESCRIPTION OF WORK**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section including the following.
 - 1. Structural thermal breaks fabricated from the following material:
 - a. Reinforced thermoset resin.
 - 2. Thermal breaks at the following locations:
 - a. Window details.
 - b. Other locations noted on the drawings.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions.
- B. Schedule: Submit a list of locations where structural thermal breaks are to be used, and the specific product and thickness to be used at each location.
- C. Shop Drawings: Submit shop drawings showing details of construction, and relationship of structural thermal break material with adjacent construction including fastening and/or anchorage connection details, thermal break material size and thickness.
- D. Thermal Design: Wall assembly or interface detail shall meet the ASHRAE 90.1 requirements for continuous insulation and shall not have structural connections (beams, support framing, sub girts, clips) which create thermal bridging.
- E. Structural Design: Design structural thermal break connections and/or façade attachment support framing using performance requirements and design criteria indicated. Provide comprehensive engineering analysis by a qualified professional engineer.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Minimum of 5 years' experience producing similar products.
- B. Preinstallation Conference: Conduct conference at Project site two weeks prior to start of work.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage and Handling: Comply with manufacturer's recommendations for storage and handling. Protect from weather damage.

1.5 WARRANTY

- A. Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Armatherm (Basis-of-Design).
- B. Fabreeka International, Inc.

2.2 REINFORCED THERMOSET THERMAL BREAKS

- A. Structural Thermal Break Material: Reinforced thermoset resin with the following attributes:
1. Compressive Strength - ASTM D638: 40,000 psi.
 2. Compressive Modulus - ASTM D695: 673,400 psi.
 3. Shear Strength - ASTM D732: 16,000 psi.
 4. Thermal Conductivity - ASTM C518: 1.05 BTU in/ hr sf degree F.
 5. Coefficient of Thermal Expansion - ASTM E831: 2.2×10^{-6} in/in/degree F.
 6. Thermal Resistance (R value) - ASTM C518: 0.95 hr sf degree F/ BTU.
 7. Surface Burning Characteristics - ASTM E84:
 - a. Flame Spread: 25 (class A).
 - b. Smoke Developed: 50 (class A).
 8. Accessories: Reinforced thermoset resin bushings and washers as applicable to location. Washers shall be minimum 0.25 inch thick. Bushing and washer to provide thermal break between steel washer/bolt and internal structural steel.
 9. Thickness: As indicated on the Drawings.
- B. Structural Performance: Provide structural thermal break material at exterior steel to interior steel or any framing connection that bypasses the continuous insulation. Provide structural thermal break material and connections capable of withstanding and/or transferring the following design loads:
1. Shear, moment and wind loads as indicated.
 2. Design structural thermal break to allow for fabrication and construction tolerances, accommodate live load deflection, shrinkage and creep of the building structure and other building movements as required by the structural drawings. Maintain structural steel deflections per AISC 360.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install thermal breaks in accordance with manufacturer's instructions and approved submittals and the following:
1. Install in proper relationship with adjacent materials.
 2. Include accessory products including bushings and washers.
 3. Protect from damage during duration of construction activities.

END OF SECTION

SECTION 07 22 16 - VENTILATED ROOF INSULATION**GENERAL****1.1 WORK INCLUDES**

- A. The work shall consist of ventilated roof insulation for areas to be shingled, with acceptance of Alternate Bid.

1.2 SYSTEM DESCRIPTION

- A. Description of system:
- B. The ventilated roof insulation shall be a preassembled panel consisting of one layer of 3/4-inch plywood (FSC), built-in ventilation space maintained by 1-inch wood spacer blocks, and isocyanurate insulation on the bottom.
- C. Wood panel edges shall be rabbetted to allow the foam edges to fit together while providing clearance between the wood sheathing on adjoining panels.
- D. Foam sides and ends shall have a machined tongue and groove profile to reduce heat loss at the joints.
- E. The wood spacer blocks shall not exceed 8 percent of the panel area and shall leave 50 percent open for lateral (across the slope) ventilation. Spacer blocks shall not be over 12 inches apart in either direction.
- F. The vent space shall provide a minimum of 10 sq. in. of Net Free Area per lineal foot of insulation along the 8' edge after deducting for the spacer blocks.
- G. The foam insulation shall have a Flame Spread Rating of 40-60.

1.3 QUALITY ASSURANCE

- A. The ventilated insulation shall be classified by Underwriters Laboratories Inc. as a shingle decking accessory for use with any Class A, B or C asphalt glass mat or asphalt organic shingle. Each bundle of ventilated panels shall bear an Underwriter Laboratory's label. If applicable FSC Chain-of-Custody procedure will apply.

1.4 SUBMITTALS

- A. The following will be submitted to the architect for approval: Copies of the manufacturer's product information and installation instructions. A sample with the edge profile specified and large enough to show the actual lateral spacing of the vent space supports. A manufacturer's dimensioned drawing showing how the 50% lateral ventilation is achieved. Calculations of spacer block percentage of panel area and the Net Free Area per Lin. Ft. of insulation after deducting for spacers.

1.5 DELIVERY AND STORAGE

- A. The ventilated insulation shall be protected in the transit by plastic covers and by truck tarps. When material is stored at the jobsite, a reasonably level, drained storage area shall be provided. The insulation shall rest on firm blocking and shall be covered with tarps.

1.6 SEQUENCING/SCHEDULING

- A. Erection of the ventilated insulation shall be coordinated with the roofing subcontractor so the roofing is applied as soon as possible after insulation is in place.

PRODUCT

- 2.1 Products shown below are acceptable provided they meet the requirements of this specification:
- A. ThermaCal® 1 Ventilated Roof Insulation Panels by GAF Cornell; www.gaf.com and www.cornellcorporation.com.
 - B. ThermaCal® Fasteners as required per the appropriate fastener pattern.

EXECUTION

3.1 PREPARATION

- A. The structural roof deck shown in the plans shall be smooth and level and free of water or debris before the ventilated insulation is installed. Apply vapor retarder specified in shingle roofing section.

3.2 SUBSTRATE INSTALLATION

- A. Installation shall follow the manufacturer's written installation instructions.
- B. Fasten with ThermaCal® Fasteners to the supporting roof deck shown in the plans.
- C. Protect ventilated insulation work from exposure to moisture damage and deterioration, primarily by prompt installation of the roofing, sheet metal and waterproofing work.

END OF SECTION

SECTION 07 25 00 - WEATHER BARRIERS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Air Barriers: Materials that form a system to stop passage of air through exterior walls, bridge and seal air leakage pathways and gaps; including all accessories necessary for a complete installation.

1.2 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

1.3 REFERENCE STANDARDS

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- C. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Shop Drawings:
 - 1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.
 - 2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 3. Include details of interfaces with other materials that form part of air barrier including, but not limited to, the following as applicable to this Project:
 - a. Connection of air barrier in walls to roof membrane.
 - b. Connection of air barrier in walls to air barrier in foundation.
 - c. Application of air barrier to seismic and expansion joints.
 - d. Application of air barrier to openings and penetrations by windows, storefront framing, curtain wall framing, door frames, piping, conduit, ducts, masonry ties, screws, bolts, and similar components and penetrations.
 - e. Application of air barrier to precast concrete and other types of exterior wall construction.
 - 4. Include details of mockups.
- D. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

- F. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.
- G. ABAA Registration: Provide registration letter from ABAA to document job has been registered with ABAA to be performed and monitored in accordance with the ABAA QAP.
- H. ABAA QAP Report: Submit copy of ABAA Quality Assurance Program Report.
- I. Testing Agency Qualification Statement.
- J. Certifications:
 - 1. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
 - 2. Acceptance of Materials: Submit document from air-barrier manufacturer certifying acceptance of materials proposed for use with air barrier that are not specified in this Section.
 - 3. Substrate Compatibility: Submit document from air-barrier manufacturer certifying that air barrier system materials used to adhere air barrier to substrate are chemically compatible.
 - 4. ABAA Certification: Submit evidence that air barrier system complies with requirements of ABAA Quality Assurance program specified in Quality Assurance article in this Section.
- K. Product Test Reports: Submit documentation from an approved independent testing laboratory certifying compliance with the air leakage rates of the air barrier membrane assembly, including primary membrane, primer and sealants have been tested to meet ASTM E2357, ICC-AC 38, Class A flame spread index and smoke development per ASTM E-84.
- L. Field Quality-Control Reports: Submit test results from testing specified in Field Quality Control article in Part 3 of this Section.

1.5 QUALITY ASSURANCE

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
 - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
 - 2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- C. Components used for complete air barrier assembly must be sourced from one manufacturer.

1.6 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at project site at least 3 weeks prior to work.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, installer, air barrier manufacturer's representative, and installers whose work interfaces with or affects air barrier installation, including but not limited to installers of masonry, sheathing products, flashings, roofing, wall panel systems, curtainwall, storefront, doors, windows, and louvers.

2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.
4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.7 MOCK-UP

- A. Build mockups to set quality standards for materials and execution.
 1. Build integrated mockups of exterior wall assembly as shown on Drawings [or 150 square feet], incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
 - b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
 - c. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- B. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on field mockups.

1.8 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

1.9 WARRANTY

- A. Provide minimum 5-year assembly warranty.

PART 2 PRODUCTS

2.1 WEATHER BARRIER ASSEMBLIES

- A. Air Barrier:
 1. On outside surface of sheathing of exterior walls use air barrier coating.
- B. Air-Barrier Assembly Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
 1. Movement/Control Joints: Provide air barrier assembly capable of accommodating movements of building and building materials, including providing expansion and control joints and applicable accessories required to accommodate these movements.

- a. Provide air barrier assembly capable of withstanding combined design wind, fan, and stack pressures, positive and negative, on building envelope without damage or displacement and transferring loads to structure.
 - b. Provide air barrier assembly materials that do not displace adjacent materials and air barrier assembly materials under full load.
 - c. Provide air barrier assembly joined in airtight and flexible manner to air barrier materials incorporated into adjacent construction and that allows relative movement of assemblies due to thermal and moisture variations, creep, and anticipated seismic movement.
2. Connections to Adjacent Materials: Provide connections to adjacent materials that prevent air leakage at following locations:
- a. Foundation and walls, including penetrations, ties and anchors.
 - b. Walls, windows, curtain walls, storefronts, louvers and doors.
 - c. Different assemblies and fixed openings within those assemblies.
 - d. Wall and roof connections.
 - e. Floors/soffits over unconditioned space.
 - f. Walls, floor and roof across construction, control and expansion joints.
 - g. Walls, floors and roof to utility, pipe and duct penetrations.
 - h. Seismic and expansion joints.
 - i. All other potential air leakage pathways in building envelope.
- C. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa), when tested according to ASTM E 2357.
- D. Fire Propagation Characteristics: Provide air barrier system qualified as a component of a comparable wall assembly that has been tested and passed NFPA 285.

2.2 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

- A. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
1. Air Barrier Membrane:
 - a. Dry Film Thickness (DFT): 30 mil, 0.030 inch, minimum.
 - b. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
 - c. Water Vapor Permeance: 11 perms, minimum, when tested in accordance with ASTM E96/E96M, Procedure B.
 - d. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to six months of weather exposure.
 - e. Elongation: 200 percent, minimum, when tested in accordance with ASTM D412.
 - f. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - g. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
 - h. Manufacturers:
 - 1) Carlisle Coatings and Waterproofing, Inc; Fire Resist Barritech-VP: www.carlisleccw.com/#sle.
 - 2) GCP Applied Technologies Inc.; Perm-A-Barrier VP or Perm-A-Barrier VP 20 LT: <https://gcpat.com/en/solutions>.
 - 3) Henry Company; Air-Bloc 33MR: www.henry.com/#sle.
 - 4) Rubber Polymer Corporation, Inc; Rub-R-Wall Airtight VP: <http://www.rpcinfo.com>.
 - 5) Soprema Inc.; LM 204 VP.
 - 6) Sto Corp.; StoGuard AirSeal: <https://www.stocorp.com/>.

- 7) Tremco Commercial Sealants & Waterproofing; ExoAir 230:
www.tremcosealants.com/#sle.
- 8) W.R. Meadows, Inc; Air-Shield LMP: www.wrmeadows.com/#sle.

2.3 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer; auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies.
- B. Structurally support air barrier system to withstand positive and negative air pressures applied to the building enclosure.
- C. Pre-formed Transition Membrane: Semi-rigid silicone or polyester composition, tapered edges, tear resistant.
 1. Manufacturers:
 - a. Dow Chemical Company; DOWSIL Silicone Transition Strip and System:
consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - b. Momentive Performance Materials, Inc/GE Construction Sealants; UltraSpan US1100 and RF100 Reinforcing Fabric: www.siliconeforbuilding.com/#sle.
 - c. Tremco Commercial Sealants & Waterproofing; ProGlaze ETA System 1:
www.tremcosealants.com/#sle.
- D. Stainless Steel Flashing: Flexible flashing with 8 mil, 0.008 inch thick sheet of Type 304 stainless steel, 8 mil, 0.008 inch of butyl adhesive and a siliconized release liner.
 1. Roll Length: 50 feet long.
 2. Overlap joints at least 2 inch.
 3. Manufacturers:
 - a. Momentive Performance Materials, Inc/GE Construction Sealants; GE Elemax SS Flashing: www.siliconeforbuilding.com/#sle.
- E. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.
- F. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- G. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft (24- to 32-kg/cu. m) density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- H. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.
 1. Apply primer to substrates at required rate and allow it to dry.

2. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.
 3. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- D. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- E. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet to provide continuous support for air barrier.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
- D. Self-Adhered Sheets:
1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
 2. Lap sheets shingle-fashion to shed water and seal laps air tight.
 3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
 4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
 5. At wide joints, provide extra flexible membrane allowing joint movement.
- E. Coatings:
1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 2. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.
 3. Use flashing to seal to adjacent construction and to bridge joints.
- F. Openings and Penetrations in Exterior Weather Barriers:
1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
 3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
 4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
 5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
 6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Coordination of ABAA Tests and Inspections:
 - 1. Provide testing and inspection required by ABAA QAP.
 - 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
 - 3. Cooperate with ABAA testing agency.
 - 4. Allow access to air barrier work areas and staging.
 - 5. Do not cover air barrier work until tested, inspected, and accepted.
 - 6. Cost of ABAA Testing and Audit: Arrange and pay for site inspections and testing by ABAA to verify conformance of air barrier with specified requirements, air barrier system manufacturer's installation instructions, and ABAA Site Quality Assurance Program.
 - 7. Reporting: Submit written audit/testing reports to Architect within 10 working days of date inspection and testing performed.
 - 8. Correction: If audit and testing reveals defects, promptly remove and replace defective air barriers at no additional cost to Owner.
- C. Do not cover installed weather barriers until required inspections have been completed.
- D. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- E. Take digital photographs of each portion of the installation prior to covering up.
- F. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - 1. Cooperate with Owner's testing agency, allowing Owner's testing agency access to work areas and staging and notifying Owner's testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection by Owner's testing agency. Do not cover Work of this section until testing and inspection by Owner's testing agency has been completed and accepted.
- G. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 - 2. Air-barrier dry film thickness.
 - 3. Adhesion tests.
 - 4. Continuous structural support of air-barrier system has been provided.
 - 5. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 - 6. Site conditions for application temperature and dryness of substrates have been maintained.
 - 7. Maximum exposure time of materials to UV deterioration has not been exceeded.
 - 8. Surfaces have been primed, if applicable.
 - 9. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
 - 10. Termination mastic has been applied on cut edges.
 - 11. Strips and transition strips have been firmly adhered to substrate.
 - 12. Compatible materials have been used.
 - 13. Transitions at changes in direction and structural support at gaps have been provided.

- 14. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
- 15. All penetrations have been sealed.
- H. Tests: Refer to Section 01 83 16, "Exterior Enclosure Requirements."
- I. Air barriers will be considered defective if they do not pass tests and inspections.
 - 1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
 - 2. Remove and replace deficient air-barrier components for retesting as specified above.
- J. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- K. Prepare test and inspection reports.

3.5 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- C. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- D. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
- E. Remove masking materials after installation.

END OF SECTION

SECTION 07 26 19 - TOPICAL MOISTURE VAPOR MITIGATION SYSTEM**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes a single-coat, fast-curing, 100% solids epoxy moisture management system formulated to suppress excessive moisture vapor emissions.
 - 1. Location: To be used where new concrete is placed within the building and the moisture and pH readings are not acceptable to the flooring manufacturer.
 - 2. Related Sections include the following:
 - a. Section 03 30 00, Cast-In-Place Concrete
 - b. Division 09 Flooring Sections

1.2 REFERENCES

- A. ASTM F2170 - Relative Humidity in Concrete Floor Slabs Using in situ Probes
- B. ASTM F1869 - Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- C. ASTM 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- D. ASTM C1583 - Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension
- E. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
- F. ASTM D1308 - Chemical Resistance of Finishes

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Qualification Data: For Installer, indicating certification by the manufacturer of the moisture mitigation product.
- C. Certification Letter: Submit certification letter from manufacturer confirming compatibility with each floor covering and its adhesives where topical moisture vapor mitigation system is to be installed.

1.4 QUALITY ASSURANCE

- A. Installation of the product must be completed by a factory trained applicator, using mixing equipment and tools approved by the manufacturer.
- B. Manufacturer Experience: Provide products of this section by companies which have successfully specialized in production of this type of work for not less than 5 years. Contact Manufacturer Representative prior to installation.

1.5 WARRANTY

- A. Certified applicator must file a pre-installation checklist with the manufacturer and receive written confirmation of the approval to proceed.
 - 1. Warranty Period: 10 years from date of substantial completion.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.

- B. Store products in a dry area with temperature maintained between 50° and 85° F (10° and 29° C) and protect from direct sunlight.
- C. Handle products in accordance with manufacturer's printed recommendations.

1.7 PROJECT CONDITIONS

- A. Do not install material below 50° F (10° C) surface and air temperatures. These temperatures must also be maintained during and for 48 hours after the installation of products included in this section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. UZIN.
- B. ARDEX.
- C. Floor Seal.
- D. Schonox.

2.2 TOPICAL MOISTURE VAPOR MITIGATION SYSTEM

- A. One-Coat Moisture Control System for Concrete:
 - 1. Representative Product: ARDEX MC RAPID; Manufactured by ARDEX Engineered Cements.
 - 2. Performance and Physical Properties: Meet or exceed the following values for material cured at 70° F+/-3°F (21° C+/-3°C) and 50% +/-5% relative humidity:
 - a. Application: Manual
 - b. Material Requirements on CSP 3 Prepared Concrete: Max 270 sq. ft. per mixed unit for 10 mils
 - c. Permeability (ASTM E96): =0.06 perms
 - d. 14 pH solution (ASTM D1308): No effect
 - e. Working Time: 20 minutes
 - f. Pot Life: 20 minutes
 - g. VOC: 0g/L, calculated SCAQMD 1113
 - h. Walkable: Minimum of 4 hours
 - i. Prime and Install Underlayment: Minimum 4 hours, maximum 24 hours

2.3 HYDRAULIC CEMENT UNDERLAYMENT

- A. Hydraulic Cement-based Self-Leveling Underlayment.
 - 1. Representative Product: ARDEX K 60; Manufactured by ARDEX Engineered Cements.
 - a. Primer: ARDEX P 82 Ultra Prime; required if moisture control system was left exposed for more than 4 hours.
 - 2. Performance and Physical Properties: Meet or exceed the following values for material cured at 70° F+/-3°F (21° C+/-3°C) and 50% +/-5% relative humidity:
 - a. Application: Barrel Mix or Pump
 - b. Flow Time: 10 minutes
 - c. Initial Set: Approx. 30 minutes
 - d. Final Set: Approx. 90 minutes
 - e. Compressive Strength: Minimum 4100 psi at 28 days, ASTM C109M.
 - f. Flexural Strength: 1000 psi at 28 days, ASTM C78.
 - g. VOC: 0 g/l, calculated SCAQMD 1113

2.4 WATER: Water shall be clean, potable, and sufficiently cool (not warmer than 70°F).

PART 3 – EXECUTION

3.1 PREPARATION

- A. Confirm compatibility of Topical Moisture Vapor Emission System selected with each flooring product and its adhesives to be used on the project.
- B. Concrete Subfloors: Prepare substrate in accordance with manufacturer's instructions.
 - 1. Prior to proceeding please refer to ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring. All concrete subfloors must be sound, solid, clean, and free of all oil, grease, dirt, curing compounds and any substance that might act as a bond breaker before application.
 - 2. Mechanical preparation of the surface is required to obtain a minimum ICRI concrete surface profile of 3 (CSP 3). This substrate preparation must be by mechanical means, such as shot blasting.
 - 3. The concrete must have a minimum tensile strength of at least 150 psi for areas to receive normal foot traffic, and 200 psi for area of heavy commercial traffic when tested in accordance with ASTM C1583. The concrete surface can be damp, but must be free of standing water.
 - 4. Prior to beginning the installation, measure the relative humidity within the concrete (ASTM F2170). Alternatively, you can also measure the surface relative humidity in accordance with ASTM F2420. For these relative humidity methods, the RH shall not exceed 100%. No standing water shall be present.
- C. Joint Preparation
 - 1. Moving Joints – honor all expansion and isolation joints up through the moisture mitigation system and underlayment. A flexible sealing compound compatible with moisture mitigation product may be installed.
 - 2. Saw Cuts and Control Joints – fill all non-moving joints with manufacturer approved joint filler.

3.2 APPLICATION

- A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.
- C. Mixing: Comply with manufacturer's printed instructions.
- D. Application: Comply with manufacturer's printed instructions and the following.
 - 1. Apply the first coat of moisture mitigation product to the prepared concrete surface in a uniform direction at the recommended application rate to achieve a coating thickness of 10 mils minimum. Use a short-nap paint roller or notched squeegee for smoother surfaces, and a longer nap roller for more uneven substrates. To minimize the potential for pinhole formation, work the material into the surface with the roller to ensure maximum penetration. A paintbrush can be used for hard to reach areas and corners.
 - 2. For Underlayment applications, prime the surface of the moisture mitigation product if required by manufacturer. Allow the primer to dry thoroughly before installing the underlayment.

3.3 PROTECTION

- A. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, Masonite or other suitable protection course.

END OF SECTION

SECTION 07 31 13 - ASPHALT SHINGLES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Asphalt shingle roofing.
- B. Flexible sheet membranes for eave protection and underlayment.
- C. Associated metal flashings and accessories.

1.2 REFERENCE STANDARDS

- A. ASTM D3462/D3462M - Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules; 2016.
- B. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).
- C. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2018.
- D. NRCA (RM) - The NRCA Roofing Manual; 2018.
- E. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating material characteristics.
- C. Shop Drawings: For metal flashings, indicate specially configured metal flashings.
- D. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern.
 - 1. Asphalt Shingles: Full size.
 - 2. Ridge and Hip Cap Shingles: Full size.
 - 3. Ridge Vent: 12-inch- (300-mm-) long Sample.
- E. Manufacturer's Installation Instructions: Indicate installation criteria and procedures.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Evaluation Reports: For synthetic underlayment, from ICC-ES or other testing and inspecting agency acceptable to authorities having jurisdiction, indicating that product is suitable for intended use under applicable building codes.
- H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 2. Asphalt Shingles: 100 sq. ft. (9.3 sq. m) of each type, in unbroken bundles.

1.4 QUALITY ASSURANCE

- A. Products are Required to Comply with Fire Resistance Criteria: UL (DIR) listed and labeled.

1.5 FIELD CONDITIONS

- A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide lifetime manufacturer's warranty for coverage against black streaks caused by algae.
- D. Provide five year manufacturer's warranty for wind damage.

PART 2 PRODUCTS

2.1 ASPHALT SHINGLES

- A. Three-Tab-Strip Asphalt Shingles: Asphalt-coated glass-fiber reinforced, mineral granule surfaced and self-sealing, complying with ASTM D3462/D3462M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:
 - a. GAF Materials Corporation; Product Slateline Series. (Basis-of-Design)
 - 2. Strip Size: Manufacturer's standard.
 - 3. Algae Resistance: Granules resist algae discoloration.
 - 4. Wind Resistance: UL 997 Wind Resistance Label.
 - 5. Impact Resistance: UL 2218, Class 4.
 - 6. Color and Blends - Basis-of-Design: GAF Slateline English Grey or accepted equivalent of other named manufacturers.
- B. Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.2 SHEET MATERIALS

- A. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970/D 1970M, minimum of 40-mil- (1.0-mm-) thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release backing; cold applied. Provide primer for adjoining surfaces to receive underlayment.
 - 1. Product of shingle manufacturer.
 - 2. Product accepted by shingle manufacturer within terms of warranty.

2.3 RIDGE VENTS

- A. Rigid Ridge Vent: Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized plastic ridge vent for use under ridge shingles.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:
 - a. Cor-A-Vent, Inc.
 - b. GAF Materials Corporation.
 - c. Owens Corning.
 - 2. Product accepted by shingle manufacturer within terms of warranty.
 - 3. Minimum Net Free Ventilation Area: Minimum 16.9 inches per lineal foot.
 - 4. Features:
 - a. Nonwoven geotextile filter strips.
 - b. External deflector baffles.

2.4 ACCESSORIES

- A. Roofing Nails: Standard round wire shingle type, galvanized steel, stainless steel, aluminum roofing nails, or copper roofing nails, minimum 3/8 inch head diameter, 12 gage, 0.109 inch nail shank diameter, sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through plywood sheathing; complying with ASTM F1667.

1. Shank: Barbed.
 2. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
 3. Accepted by shingle manufacturer within terms of warranty.
- B. Plastic Cement: ASTM D4586/D4586M, asphalt roof cement.

2.5 METAL FLASHINGS

- A. Metal Flashings: Provide sheet metal eave edge, gable edge, ridge, ridge vents, open valley flashing, and other flashing indicated.
1. Apron Flashings: Fabricate with lower flange a minimum of 5 inches (125 mm) over and 4 inches (100 mm) beyond each side of downslope asphalt shingles and 6 inches (150 mm) up the vertical surface.
 2. Drip Edges: Fabricate in lengths not exceeding 10 feet (3 m) with 2-inch (50-mm) roof-deck flange and 1-1/2-inch (38-mm) fascia flange with 3/8-inch (9.5-mm) drip at lower edge.
- B. Vent Pipe Flashings: ASTM B 749, Type L51121, at least 1/16 inch thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least 4 inches from pipe onto roof.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning work.
- B. Verify that roof deck is of sufficient thickness to accept fasteners.
- C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.
- D. Verify roof openings are correctly framed.
- E. Verify deck surfaces are dry, free of ridges, warps, or voids.
- F. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Seal roof deck joints wider than 1/16 inch as recommended by shingle manufacturer.
- B. At surfaces receiving underlayment, fill knot holes and surface cracks with latex filler.
- C. Broom clean deck surfaces before installing underlayment.

3.3 INSTALLATION - UNDERLAYMENT

- A. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install lapped in direction that sheds water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Roll laps with roller. Cover underlayment within seven days.
1. Prime concrete and masonry surfaces to receive self-adhering sheet underlayment.
 2. Eaves: Extend from edges of eaves 36 inches (914 mm) beyond interior face of exterior wall.
 3. Install on entire roof area.
 4. Roof-Penetrating Elements: Return vertically against penetrating element not less than 4 inches (100 mm).

3.4 INSTALLATION - METAL FLASHING AND ACCESSORIES

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
 - 1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."
- B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.
- C. Rake Drip Edges: Install rake drip-edge flashings over underlayment and fasten to roof deck.
- D. Eave Drip Edges: Install eave drip-edge flashings below underlayment and fasten to roof sheathing.
- E. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.5 INSTALLATION - SHINGLES

- A. Install shingles in accordance with manufacturer's instructions manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Install starter strip along lowest roof edge, consisting of an asphalt-shingle strip with self-sealing strip face up at roof edge.
 - 1. Extend asphalt shingles 1/2 inch (13 mm) (19 mm) over fasciae at eaves and rakes.
 - 2. Install starter strip along rake edge.
- C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- D. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full-length first course followed by cut second course, repeating alternating pattern in succeeding courses.
- E. Fasten asphalt-shingle strips with a minimum of six roofing nails located according to manufacturer's written instructions.
 - 1. Where roof slope exceeds 21:12, seal asphalt shingles with asphalt roofing cement spots.
 - 2. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots.
 - 3. When ambient temperature during installation is below 50 deg F (10 deg C), seal asphalt shingles with asphalt roofing cement spots.
- F. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.
- G. Ridge Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.
- H. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.
- I. Complete installation to provide weather tight service.

END OF SECTION

SECTION 07 42 13 - METAL WALL PANELS**PART 1 GENERAL****1.1 SUMMARY**

- A. Factory-formed and field-assembled, concealed-fastener, lap-seam, profiled metal wall panels.

1.2 DEFINITION

- A. Metal Wall Panel Assembly: Metal wall panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight system.
- B. Steel Sheet Thickness: Minimum thickness of base metal without metallic coatings or painted finishes.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide metal wall panel assemblies that comply with performance requirements specified as determined by testing manufacturers' standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.
- B. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of wall area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft.
- C. Water Penetration: No water penetration when tested according to ASTM E 331 at a minimum differential pressure of 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq. ft. and not more than 12 lbf/sq. ft.
- D. Wind Loads: International Building Code 2015; Factory Mutual Global and ASCE 7.
- E. Deflection Limits: Engineer metal wall panel assemblies to withstand test pressures with deflection no greater than 1/240 of the span and no evidence of material failure, structural distress, or permanent deformation exceeding 0.2 percent of the clear span, unless Code requires greater requirements.
- F. Seismic Performance: International Building Code 2015; and comply with ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads.
- G. Thermal Movements: Provide metal wall panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal wall panel and accessory.
- B. Qualification Data: For installer, manufacturer and professional engineer; include 5 copies.
- C. Shop Drawings: Include required sets prepared by or under the supervision of a qualified professional engineer licensed in the State of Maryland, detailing fabrication and assembly of metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory and field-assembled work.

1. Accessories: Include details of the flashing and trim, at a scale of not less than 1-1/2 inches per 12 inches.
 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 3. Engineer to be employed by the manufacturer and licensed in the State of Maryland.
- D. Coordination Drawings: Exterior elevations drawn to scale and coordinating penetrations and wall-mounted items. Show the following:
1. Wall panels and attachments.
 2. Girts or framing.
 3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
- E. Samples for Verification:
1. For each type of exposed finish required.
 2. Metal Wall Panels: Actual panel width; minimum 12 inch length. Include fasteners, closures, and other metal wall panel accessories.
- F. Qualification Data: For installer and Professional Engineer.
- G. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:
1. Materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants.
 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for the following:
1. Metal Wall Panels: Include reports for air infiltration, water penetration, and structural performance.
- I. LEED Submittals: Comply with Section 018113.
1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For wall panels: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content wall panels: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
- J. Maintenance Data: For metal wall panels to include in maintenance manuals.
- K. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Manufacturer Qualifications: Manufacturer capable of providing engineering and field service representation during construction and approving acceptable installer.
1. Engineering Responsibility: Preparation of data for including the following:
 - a. Shop Drawings and comprehensive engineering analysis by a qualified professional engineer licensed in the State of Maryland.
 2. Company with a minimum of ten years of continuous experience manufacturing panel material of the type specified and capable of providing the following information.
 3. List of five other projects of similar size, including approximate date of installation and name of Architect for each.

- C. Source Limitations: Obtain each type of metal wall panel through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of metal wall panels and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
 - 2. Submit no fewer than nine pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
- E. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects.
 - 1. Provide components for installation in mock-ups, as indicated in Section 04 20 00 and the Drawings.
 - 2. Approval of mockups is for other material and construction qualities specifically approved by Architect in writing.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
- F. Preconstruction Conference: Before starting wall framing, sheathing, or girt construction, conduct conference at Project site. Review methods and procedures related to wall construction and metal wall panels including, but not limited to, the following:
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal wall panel Installer, metal wall panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal wall panels including installers of doors, windows, and louvers.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review methods and procedures related to metal wall panel installation, including manufacturer's written instructions.
 - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
 - 6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
 - 7. Review temporary protection requirements for metal wall panel assembly during and after installation.
 - 8. Review wall panel observation and repair procedures after metal wall panel installation.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal wall panels, and other manufactured items so as not to be damaged or deformed. Package metal wall panels for protection during transportation and handling.
- B. Unload, store, and erect metal wall panels in a manner to prevent bending, warping, twisting, and surface damage.

- C. Stack metal wall panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Protect strippable protective covering on metal wall panels from exposure to sunlight and high humidity, except to extent necessary for period of metal wall panel installation.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal wall panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal wall panel fabrication and indicate measurements on Shop Drawings.

1.8 COORDINATION

- A. Coordinate metal wall panel assemblies with rain drainage work, flashing, trim, and construction of girts, studs, soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Basis-of-Design Products: The design for each metal wall panel specified is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified that meet or exceed the performance and aesthetic characteristics of the Basis-of-Design products.

2.2 PANEL MATERIALS

- A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality; having recycled content.
 2. Surface: Smooth finish as standard for manufacturer and gage.
 3. Exposed Finishes:
 - a. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1) Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat; clear coat finish. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
 5. Recycled Content: Provide steel with minimum 25 percent recycled content.
- B. Panel Sealants:
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.3 MISCELLANEOUS METAL FRAMING

- A. Steel Sheet Components, General: Complying with ASTM C 645 requirements for metal and with ASTM A 653, G60, hot-dip galvanized zinc coating and having recycled content.
- B. Subgirts: Fabricated from minimum 16 gage zinc coated steel conforming to ASTM A 653 SQ Grade 37, G90 coating.
- C. Zee Clips: 0.079-inch bare steel thickness, cold-formed, galvanized steel sheet.
- D. Base or Sill Channels: 0.079-inch bare steel thickness, cold-formed, galvanized steel sheet.
- E. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum bare metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.
- F. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal wall panels by means of plastic caps or factory-applied coating.
 1. Fasteners for Wall Panels: 300 series stainless steel with 5/8-inch bonded neoprene or EPDM and stainless washers.
 2. Concealed fasteners to be cadmium plated carbon steel.
- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. General: Provide factory-formed metal wall panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.
- B. Metal Panel: Uninsulated with 12 inches in coverage width.
 - 1. Manufacturers and Profiles:
 - a. Morin; Integrity Series. (Basis-of-Design)
 - 1) X-12; Drawing Designation MP-1 (vertical).
 - 2) XF-12; Drawing Designation MP-2 (vertical) and MP-4 (horizontal); alternating with XC-12 for Drawing Designation MP-3 (vertical).
 - 3) XC-12; alternating with MX3.0 for Drawing Designation MP-3 (vertical).
 - b. Imetco; custom profiles to match Basis-of-Design.
 - c. Atas; profiles to match Basis-of-Design.
 - 1) MFN120; Drawing Designation MP-1 (vertical).
 - 2) MFN120 modified for two ribs; Drawing Designation MP-2 (vertical) and MP-4 (horizontal); alternating with custom panel for Drawing Designation MP-3 (vertical).
 - 3) Custom profile matching Basis-of-Design; alternating with MFN120 (modified) for Drawing Designation MP-3 (vertical).
 - 2. Architect to review vertical orientation of panels vertically for asymmetrical ribs.
 - 3. Material: Zinc-coated (Galvanized) steel sheet ASTM A 653, G90 coating; minimum 20 gage nominal thickness.
 - a. Exterior Facing Finish: 2-coat fluoropolymer.
 - 1) Color: Multiple colors to be determined from Basis-of-Design full range of colors, including mica selections.
 - b. Interior Facing Finish: Manufacturer's standard siliconized polyester where unexposed; match exterior facing finish where exposed (equipment screen).

2.6 CONCEALED-FASTENER, METAL SOFFIT PANELS - UTILITY SHED

- A. Metal Soffit Panels, General: Factory-formed, concealed fastener panels with interconnecting side joints, fastened to supports with concealed fasteners, with factory-applied sealant in side laps.
- B. Flush-joint profile.
 - 1. Basis-of-Design Product: Morin Matrix Series MX6.0, or equivalent of other manufacturers named in this section.
 - 2. Material: Aluminum sheet, minimum 0.040 thickness; perforated.
 - a. Exterior Facing Finish: 2-coat fluoropolymer.
 - b. Interior Facing Finish: Manufacturer's standard siliconized polyester where unexposed; match exterior facing finish where exposed (equipment screen).

2.7 ACCESSORIES

- A. Provide components required for a complete metal wall panel assembly including trim, copings, fascia, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.
- B. Extruded Trim: Manufacturer's complementary aluminum extrusions for head, jamb, sill, base, flush, reveal, inside and outside corner, end wall, and expansion joint details. Finish to match metal wall panels.
 - 1. Extruded trim must be provided at all base of wall and any trims below second floor level.

2.8 FABRICATION

- A. General: Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
 - 1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
 - 2. Fabricate wall panels with panel stiffeners as required to maintain fabrication tolerances and to withstand design loads.
- B. Provide factory-fabricated mitered corners; field cut and joined corners will not be accepted.
 - 1. Mitered corner assemblies shall match specified exterior profile panel in shape, general appearance, material and finish.
 - 2. Mitered corner assemblies shall be factory coil coated to match adjacent panels; paint finish shall meet specified warranty requirements.
- C. Fabricate metal wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 3. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal wall panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of work.
 - 1. Examine primary and secondary wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
 - 2. Examine solid wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
 - 3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorage according to ASTM C 754 and metal wall panel manufacturer's written recommendations.

3.3 METAL WALL PANEL INSTALLATION, GENERAL

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Commence metal wall panel installation and install minimum of 300 sq. ft. in presence of factory-authorized representative.
 2. Field cutting of metal wall panels by torch is not permitted.
 3. Shim or otherwise plumb substrates receiving metal wall panels.
 4. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction.
 5. Flash and seal metal wall panels with weather closures at eaves and at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until weather barrier and flashings that will be concealed by metal wall panels are installed.
 6. Install screw fasteners in predrilled holes.
 7. Locate and space fastenings in uniform vertical and horizontal alignment.
 8. Install flashing and trim as metal wall panel work proceeds.
 9. Provide panel splices with structural support behind each joint. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 10. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated or, if not indicated, as necessary for waterproofing.
 11. Align bottom of metal wall panels and fasten with fasteners as recommended by the metal wall panel manufacturer. Fasten flashings and trim around openings and similar elements with fasteners as recommended by the metal wall panel manufacturer.
 12. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
- B. Fasteners: Stainless steel.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal wall panel manufacturer.
- D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal wall panel manufacturer.
 1. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealers."
 2. Seal noninsulated metal wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer.

3.4 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
 1. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal wall panel units within installed tolerance of 1/4 inch in 20 feet, nonaccumulative, on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

- A. Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Water-Spray Test: After completing the installation of 75-foot length by full height area of metal wall panel assembly, test assembly for water penetration according to AAMA 501.2.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal wall panel installation, including accessories. Report results in writing.
- D. Remove and replace applications of metal wall panels where inspections indicate that they do not comply with specified requirements.
- E. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer. Maintain in a clean condition during construction.
- B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 52 16 - MODIFIED BITUMINOUS MEMBRANE ROOFING**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Self-adhered air and vapor control membrane applied at composite concrete roof deck locations.
 - 2. Roofing insulation.
 - 3. Base ply sheet; cold-applied.
 - 4. Energy star rated cap sheet; cold-applied with heat-welded seams.
 - 5. Related base flashings, expansion joints, cant strips, insulations, fasteners, terminations, and incidental or other Work as may be necessitated by these operations and called for by the Drawings.
 - 6. Flashing systems to be liquid applied; base flashings to be SBS base ply finished with liquid applied flashing.
- B. Cold-applied system provided to comply with this section may be a plies set in cold adhesive or self-adhering plies; self-adhering system can only be provided in climatic conditions defined by this section, or more stringent requirements of the manufacturer.
- C. Section includes the installation of insulation strips in ribs of acoustical roof deck. Insulation strips are furnished under Division 5 Section "Steel Deck."

1.2 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing.

1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- D. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- F. Emergency Response Plan:
 - 1. Any damage to the building caused by the Work, leaks or accidents must be addressed immediately by the Contractor as an emergency.
 - 2. The Contractor must respond to leaks or problems at the site during construction with a repair crew within three hours of phone notification.

3. Provide a complete emergency telephone list for at least three responsible company representatives that will be on call during the course of the Project; include cell phone numbers, pager numbers and home phone numbers.
 4. Designate one emergency contact in writing to Owner on a weekly basis.
- G. Should there be any deviation from the Contract Documents without the prior written consent of the roofing material manufacturer and the Architect; the Contractor must do all necessary corrective work to make the roof acceptable to the Architect at no additional cost to the Owner.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED Submittals: Comply with Section 018113.
1. MR Credit 4: BPDO - Material Ingredients
 - a. For insulation, if available: Material Ingredient Report.
 2. Data showing the LEED requirements for heat reduction.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
1. Base flashings and terminations.
 2. Tapered insulation, including slopes.
 3. Crickets, saddles, and tapered edge strips, including slopes.
 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 5. Indicate membrane layout.
 6. Receive approval of details relating to the installation of the roof system from the roofing material manufacturer; system to be installed in a manner that the manufacturer will furnish the specified warranty for the installation.
- D. Samples for Verification: For the following products:
1. Roofing materials, including ply sheet, cap sheet and flashing sheet, of color specified.
 2. Roof insulation.
 3. Six insulation fasteners of each type, length, and finish.
 4. Walkway pad material.
- E. Qualification Data: For qualified Installer and manufacturer.
- F. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing complies with requirements specified in "Performance Requirements" Article.
1. Submit evidence of compliance with performance requirements.
 - a. Include wind uplift design specific to this project, with uplift pressures indicated on roof plan and manufacturer's certification of the systems capability to perform to requirements; indicate product names in certification.
 2. Provide letter from roofing manufacturer providing materials and warranty for this project, indicating installer is qualified under the program listed under the Quality Assurance provisions of this section.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing.
- H. Maintenance Data: For roofing to include in maintenance manuals.
- I. Warranties: Sample of special warranties.
- J. Inspection Report: Roofing system manufacturer's inspection report of complete roofing installation.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
1. Manufacturer must have a minimum 20 years' experience manufacturing SBS modified bitumen roofing membranes.
 2. Provide a factory trained technician for participation in the pre-installation conference, and final inspection of the roofing system.
 3. Provide a warranty upon satisfactory installation of the roofing system.
- B. Installer Qualifications:
1. Qualified firm approved by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
 - a. Firm experienced in installation of system to be provided for this project.
 - b. Firm having successful completion of minimum 5 projects of comparable scale and complexity within three years of bid date, with same roofing manufacturer proposed for this Project.
 - c. Firm having adequate number of skilled workmen experienced with the specified requirements and the methods needed for proper performance of the work in this section.
 2. Maintain full-time supervisor/foreman, not workman/foreman, on job site during times that roofing work is in progress. Supervisor must have minimum of three years' experience in roofing work comparable to scale and complexity of this project.
 3. Installer must have a repair crew or shall contract with a repair crew within a 100 mile radius of the project.
- C. Installer Certification:
1. Installer must be certified by the manufacturer providing product for this project, within that manufacturer's quality or training program listed below:
 - a. Polyglass Preferred Contractor Program; Polyglass Commercial Systems.
 - b. Siplast Select Contractor; Siplast.
 - c. Authorized Soprema Contractor (through Contractor's Training Program); Soprema.
 - d. Certified Applicator; Tremco.
 - e. NRCA PRO Certification Program is acceptable in place of a manufacturer's program.
 2. The installer's ability to purchase materials to perform the Work of this Project is not acceptable instead of official standing in one of the named programs.
 3. Proposed alternative programs based on volume of work instead of performance or training will not be acceptable
- D. Contractor will acquire an inspector employed in the roofing industry for minimum of 7 years, experienced in providing inspection services on five similar projects within the past 12 months; with structured training by the manufacturer providing roofing for this project, and authorized by manufacturer to produce periodic inspection reports and decline work not in compliance with warranty requirements and Contract Documents. Periodic inspections shall be performed as required by the manufacturer to provide the specified warranty, or as required by the Architect to review non-conforming work.
- E. Source Limitations: Obtain components including roof insulation, fasteners for built-up roofing from same manufacturer as roofing or approved by roofing manufacturer.
- F. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

1.6 PREINSTALLATION MEETINGS

- A. Pre-installation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
 - 7. Review governing regulations and requirements for insurance and certificates if applicable.
 - 8. Review temporary protection requirements for roofing during and after installation.
 - 9. Review roof observation and repair procedures after roofing installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

- A. Proceed with installation only when existing and forecasted weather conditions permit roofing to be installed according to manufacturer's written instructions and warranty requirements.
- B. Cold-Weather Limitations for Self-Adhering Systems: Contractor may provide a system of self-adhering plies to fulfill requirements of this section, only when the following minimal conditions are assured.
 - 1. Ambient temperature must be at least 50 degrees F and rising, to ensure conditions remain acceptable to apply self-adhesive primer and membrane plies.
 - 2. Ambient temperature forecast must predict at least 40 degrees F for the period of 72 hours following installation membrane plies.
 - 3. Self-adhesive primer and membrane temperature to be 70 degrees F at application; condition materials within controlled storage.
 - 4. More stringent requirements of the manufacturer must take precedent, as applicable.

1.9 SEQUENCING AND SCHEDULING

- A. Coordinate Work with installing associated metal flashings as Work of this Section proceeds.
- B. Verify the Work of other trades which is to be concealed by this Work; Work to be concealed, must be inspected and approved before proceeding with the installation.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of roofing, perimeter metal systems that fail in materials or workmanship within specified warranty period; this represents a total system warranty.
 - 1. System must include an insulation system acceptable to the roofing membrane manufacturer as part of their total system warranty.
 - 2. Roofing manufacturer must accept other manufacturers within the total roof system warranty which also manufactures products for the roofing manufacturer's private label.
 - 3. Manufacturer's Roof System Warranty must include perimeter metal system specified within other sections of this Project Manual.
- B. Warranty Type: NDL (no dollar limit) warranty, certifying the performance of installed products and the consistency of the properties of such products affecting their performance for the warranty period from date of acceptance and that installation of the product is in accordance with manufacturer's requirements.
- C. Warranty Period: 20 years from date of Substantial Completion.
- D. Special Project Warranty - Installer: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 ROOFING MANUFACTURERS

- A. Polyglass Commercial Systems: Self-adhering application; subject to climatic conditions.
 - 1. Base Sheet as Vapor Barrier (Concrete Roof Decks): Elastoflex SA V.
 - 2. Base Ply (Field): Elastoflex SA V Plus FR.
 - 3. Cap Ply (Field): Polyfresko G SA FR.
 - 4. Flashing Base Ply: Elastoflex SA V.
 - 5. Flashing Cap Ply: Not required; provide topcoat of liquid flashing material.
 - 6. Self-Adhered Primer: Required before all applications (no exceptions); product as recommended by the membrane manufacturer.
- B. Siplast, Inc.
 - 1. Base Sheet as Vapor Barrier (Concrete Roof Decks): Paravent.
 - 2. Base Ply (Field): Paradiene 20 EG (ASTM D6163, Type II, S)
 - 3. Cap Ply (Field): Paradiene 30 FR BW (ASTM D6163, Type I, G).
 - 4. Flashing Base Ply: Paradiene 20.
 - 5. Flashing Cap Ply: Not required; provide topcoat of liquid flashing material.
- C. Soprema, Inc.
 - 1. Cold-Adhesive Application:
 - a. Base Sheet as Vapor Barrier (Concrete Roof Decks): Colvent 180 SA.

- b. Base Ply (Field): Sopralene 180 Sanded (21); ASTM D6164, Type I, Grade S.
 - c. Cap Ply (Field): Elastophene LS FR GR SG.
 - d. Base Ply Flashing Membrane: Sopralene 180 Sanded 2.2.
 - e. Flashing Cap Ply: Not required; provide topcoat of liquid flashing material.
2. Self-Adhering Application: Subject to climatic conditions.
- a. Base Sheet as Vapor Barrier (Concrete Roof Decks): Elastophene Stick.
 - b. Base Ply (Field): Sopralene Stick.
 - c. Cap Ply (Field): Elastophene Stick FR GR SG.
 - d. Base Ply Flashing Membrane: Sopralene Stick.
 - e. Flashing Cap Ply: Not required; provide topcoat of liquid flashing material.
 - f. Self-Adhered Primer: Required before all applications (no exceptions); product as recommended by the membrane manufacturer.
- D. Tremco Incorporated - Basis-of-Design.
- 1. Base Sheet as Vapor Barrier (Concrete Roof Decks): AVC Membrane.
 - 2. Base Ply: Power Ply Heavy Duty minimum 110 mil thickness (ASTM D6162 or D6163, Type II, S).
 - 3. Cap Ply: Power Ply Standard FR GT24W (ASTM D6163, Type I, G).
 - 4. Flashing Base Ply: Power Ply Heavy Duty minimum 110 mil thickness (ASTM D6162 or D6163, Type II, S).
 - 5. Flashing Cap Ply: Not required; provide topcoat of liquid flashing material.

2.2 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing manufacturer for intended use and compatible with roofing.
- 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Asphalt Primer: ASTM D 41/D 41M.
- C. Energy Star Cap Sheet and Flashing Adhesive - Adhesive Applications:
- 1. Cold-applied bio-based low odor urethane roofing adhesive, two-part, formulated for compatibility and use with specified roofing membranes and flashings.
 - a. Basis of design product: Tremco, POWERply Endure Bio Adhesive or equivalent of other manufacturers.
 - 1) Siplast, Inc.: SFT Adhesive.
 - 2) Soprema, Inc.: Colply EF.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3690: 1 g/L.
 - c. Low Temperature Flexibility, ASTM D 2240: 88 Shore A.
 - d. Solids, by Volume, ASTM D 2697: 100 percent.
 - 2. Give preference to bio-based products.
- D. Liquid Flashing Materials: Provide the reinforced liquid flashing system offered by the roofing membrane manufacturer; provide for all flashing locations other than base flashing locations at perimeter of building and equipment curbs.
- 1. Polyglass Commercial Systems: Polyflash 1C.
 - 2. Siplast, Inc.: Parapro 123 Flashing.
 - 3. Soprema, Inc.: ALSAN RS Flashing systems.
 - 4. Tremco Inc.: AlphaGuard Bio system.
- E. Mastic Sealant: Polyisobutylene, plain or modified bitumen, nonhardening, nonmigrating, nonskinning, and nondrying.

- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing manufacturer.
 - 1. Fasteners must be of length to remain concealed in cellular design of metal roof deck, where this type of deck profile is indicated.
 - 2. Wood: Roofing nails of galvanized steel, long enough to penetrate the wood by at least 3/4 inch on flashings and parapet walls.
 - a. Provide fasteners with hot-dip zinc coating complying with ASTM A 153 and thickness to prevent corrosion with chemical preservative or fire-resistive treatments; G-185 designation or heavier coating.
 - 3. Masonry: Nail-in expansion type device with zinc body, plated steel nail, mushroom head and long enough to embed into the masonry a minimum of 1 inch.
- G. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 (2.36-mm) sieve and 98 percent of mass retained on No. 40 (0.425-mm) sieve, color to match roofing.
- H. Metal Flashing Sheet: Metal flashing sheet is specified in Division 7 Section "Sheet Metal Flashing and Trim."
- I. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing manufacturer.

2.3 INSULATION MATERIALS

- A. General: Provide preformed, roofing insulation boards that comply with requirements, selected from manufacturer's standard sizes and of thicknesses indicated.
 - 1. Provide preformed, tapered insulation boards where indicated for sloping to drain. Fabricate with a taper of 1/4-inch per 12 inches, unless otherwise indicated.
 - 2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- B. Insulation Performance Across Roof Areas: $U = 0.032$ or better, using LTTR values; taper to drain cannot be less than 1-inch below minimum insulation thickness determined by performance requirement.
- C. Rigid Polyisocyanurate Roof Insulation:
 - 1. Qualities: Polyisocyanurate board to ASTM C1289, Type II, Class I, Grade 3; rigid, closed cell type, with specially formulated organic/inorganic facers.
 - 2. Available Manufacturers:
 - a. ENRGY 3 by Johns Manville.
 - b. H-Shield by Hunter Panels.
 - c. Hy-Therm AP-25 by DOW Chemical Company.
 - d. Roofing Manufacturer.
 - 3. Physical Properties:
 - a. Board Size: 48 inches x 48 inches or 48 inches x 96 inches.
 - b. Nominal Product Thickness: Maximum single layer to be 2.6 inches.
 - c. Compressive Strength (ASTM D1621): Minimum 25 psi (170kPa).
 - d. Density (ASTM D1622): 2 pcf.
 - e. Edges: Square.
 - f. Dimensional Stability: Less than 2 percent linear change.
 - 4. Provide tapered insulation as indicated on Drawings; 1/4 inch per running foot.

- D. Fabrication of Tapered Insulation:
 - 1. Factory pre-cut boards not to exceed 4' x 4' with top surface cut to provide a continuous slope indicated on Drawings.
 - 2. Tapered insulation exceeding 3 inches shall be in two layers, to include starter and filler blocks fabricated to assure staggering of all vertical joints both ways between layers.
 - 3. All miters shall be factory cut, consisting of two diagonally cut abutting blocks with matching edges and thickness.
 - 4. Each piece shall be identified in accordance with reviewed shop drawings.
- E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- F. Cover Board:
 - 1. Project Standard: 1/4-inch DENS-DECK Prime Roof Board by G-P Gypsum Corp.; other available products include:
 - a. DEXcell FA Glass Mat Roof Board by National Gypsum Company.
 - b. SECUROCK by USG.
 - 2. Performance Characteristics:
 - a. Nonstructural, glass mat-embedded, water-resistant gypsum core panels.
 - b. UL Classified Type DGG when tested in accordance with ASTM E119.
 - c. ASTM C1177 compliance.
 - d. Noncombustible core per ASTM E136.

2.4 INSULATION ACCESSORIES

- A. General: Furnish roofing insulation accessories recommended by insulation manufacturer for intended use and compatible with roofing material.
- B. Fasteners: Fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470.
 - 1. Insulation, Tapered Insulation and Cover Board:
 - a. Mechanical fasteners for securement of insulation, tapered insulation, and cover board panels to decking must be approved by the insulation manufacturer for the system specified.
 - b. The same brand fastener is to be used throughout the Work.
 - c. Number of fasteners and layout must be as recommended by the manufacturer.
 - d. Length of fastener to be determined by the thickness of the decking and any fill, and will vary with the thickness of the insulation; fasteners must be of appropriate length to achieve a minimum of 1 inch penetration.
 - e. Acoustical Deck Locations: Fasteners not to exceed length necessary to remain concealed in acoustical cells of steel deck.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Low-rise, two-component urethane adhesive.
- D. Tapered Edge Strips: Rigid, cellulosic-fiber insulation board, complying with ASTM C 208, Type 2; coated on six sides.

2.5 WALKWAYS

- A. Roof Walkways: Asbestos-free asphalt pad reinforced with fiberglass and surfaced with non-skid white ceramic granules., manufactured specifically for adhering to roofing as a protection course for foot traffic.
 - 1. Basis-of-Design: Trem-Tred Walkway Panel.

- B. Walk pads must be installed with space between pieces for lateral water movement.
- C. Locations: At equipment, ladders, roof hatches; and any other locations indicated on Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 - 2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- D. Prime surface of concrete deck with asphalt primer at a rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m), and allow primer to dry.
- E. Install insulation strips in ribs of acoustical roof decks according to acoustical roof deck manufacturer's written instructions.

3.3 INSTALLATION, GENERAL

- A. Comply with roofing system manufacturer's written instructions.
- B. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.4 VAPOR-RETARDER INSTALLATION

- A. Self-Adhering Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2 inches (90 mm) and 6 inches (150 mm), respectively. Seal laps by rolling.
- B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.5 INSULATION INSTALLATION

- A. Comply with roofing manufacturer's written instructions for installing roof insulation.
- B. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing system with vertical surfaces or angle changes greater than 45 degrees.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.

- D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- E. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.6 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- G. Adhered Insulation - Concrete Deck with Self-adhered Air and Vapor Control Membrane: Install each layer of insulation and adhere to substrate as follows:
 - 1. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2. Adhesive ribbon application to be of the appropriate tested spacing within the roofing field, at roofing perimeters, and within corners, to meet performance requirements within the Section.
 - 3. Apply temporary weight uniformly over boards to ensure full contact and bonding with adhesive.
- H. Metal Deck Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten first layer of insulation according to wind uplift requirements for indicated Windstorm Resistance Classification.
 - 2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
 - 3. Acoustical Deck Locations: Fasteners not to exceed length necessary to remain concealed in acoustical cells of steel deck.
 - 4. Non-Cellular Deck Locations: Where the underside of the metal deck will be exposed to view, limit length of screw exposure under deck to 3/4 inches.
 - 5. Set each subsequent layer of insulation in adhesive.
- I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck. Tape joints if required by roofing manufacturer.
 - 1. Adhere cover boards according to wind uplift requirements for indicated Windstorm Resistance Classification.
 - 2. Adhere cover boards to resist uplift pressure at corners, perimeter, and field of roof.
 - 3. Apply adhesive to underside, and immediately bond cover board to substrate.

3.6 ROOFING INSTALLATION, GENERAL

- A. Install roofing membrane according to roofing manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."
- B. Start installation of roofing in presence of manufacturer's technical personnel.
- C. Cooperate with testing agencies engaged or required to perform services for installing roofing.
- D. Coordinate installation of roofing so insulation and other components of roofing not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt with joints and edges sealed.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.7 ROOFING MEMBRANE INSTALLATION

- A. Install modified bituminous roofing sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond eaves, installing as follows:
 1. Adhere to substrate in cold-applied adhesive or self-adhering system.
 2. Unroll roofing sheets and allow them to relax for minimum time period required by manufacturer.
- B. Base Ply Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely seal laps, leaving no voids.
 1. Repair tears and voids in laps and lapped seams not completely sealed.
- C. Install energy star cap sheet with heat-welded sheet seams, according to manufacturer's instructions.
 1. Strictly follow roofing manufacturer's heat welding process for the seaming of membrane-to-membrane laps of the specified cap sheet. Contractor may only exclude the heat welding process when able to submit FM documentation demonstrating seam strength within 10 percent or better, of welded seam tests.
 2. Clean minimum 4 inch (102 mm) wide seam area on both surfaces to be joined. Remove debris and contaminants. Allow seam to thoroughly dry prior to performing welding.
 3. Continuously weld 4 inch (102 mm) wide seam using roofing manufacturer's recommended automatic heat welding machine or hand-held heat gun. Roll seam with minimum 75 lb (34 kg) steel roller.
- D. Prepare an inspection and testing program, including inspection for voids and probing the entire seam area after the seam has cooled; seal seams that fail inspection as directed by roofing manufacturer.

3.8 BASE FLASHING AND STRIPPING INSTALLATION

- A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing manufacturer's written instructions and as follows:
 1. Prime substrates if required by roofing manufacturer.
 2. Backer-Sheet Application: Adhere backer sheet to substrate in cold-applied adhesive and mechanically terminate top edge; prepare for liquid flashing system.
- B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing and 6 inches onto field of roofing.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
 1. Seal top termination of base flashing with a metal termination bar.
- D. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.
- E. Install stripping, according to roofing manufacturer's written instructions, where metal flanges and edgings are set on roofing.

1. Install stripping of not less than two roofing membrane ply sheets, setting each ply in a continuous coating of asphalt roofing cement or in a solid mopping of hot roofing asphalt, and extend onto roofing membrane 4 inches and 6 inches, respectively.
2. At end of project clean all flashings to provide clean white sheet.

3.9 FLUID-APPLIED FLASHING APPLICATION

- A. Prime any surfaces that fluid applied flashing will not be directly to a new roofing ply with primer and allow to cure, as directed by manufacturer.
- B. For metal flashing surfaces prime with polyurethane metal primer at 400-500 sqft per gal.
- C. Fluid-Applied Flashing Application:
 1. Extend coating minimum of 8 inches up vertical surfaces and 4 inches onto horizontal surfaces.
- D. Base Coat: Apply coating base coat to asphaltic base sheet surfaces in accordance with manufacturer's written instructions. Back roll to achieve minimum wet mil coating thickness of 48 mils unless otherwise recommended by manufacturer; verify thickness of base coat as work progresses.
 1. Apply base coat on prepared and primed surfaces and spread coating evenly.
 2. Embed fiberglass reinforcement into wet base coat. Lap adjacent flashing pieces of fiberglass minimum 3 inches along edges and 6 inches at end laps.
 3. Roll surface of fiberglass reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.
 4. Allow base coat to cure prior to application of top coat.
 5. Following curing of base coat and prior to application of top coat, sand raised or exposed edges of fiberglass reinforcement.
- E. Top Coat: Apply top coat uniformly in a complete installation to flashings.
 1. Prime base coat with reactivation primer prior to application of top coat if top coat is not applied within 72 hours of the base coat application, using manufacturer's recommended primer.
 2. Apply top coat to flashings extending coating up vertical surfaces and out onto horizontal surfaces 4 inches. Install top coat over field base coat and spread coating evenly.
 3. Back roll to achieve wet mil thickness of 32 mils unless otherwise recommended by manufacturer.
 4. Avoid foot traffic on new fluid-applied membrane for a minimum of 24 hours.
- F. Roof Drains: Set 30-by-30-inch square metal flashing in bed of asphalt roofing cement on completed roofing membrane. Cover metal flashing with roofing membrane cap-sheet stripping and extend a minimum of 6 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
 1. Drains can also be flashed with the Fluid-Applied flashing system at the Contractors discretion.
 2. Install stripping according to roofing system manufacturer's written instructions.
- G. Pitch pockets not permitted unless indicated on the Drawings or accepted by the Architect during shop drawings submittals as an exception.

3.10 WALKWAY INSTALLATION

- A. Roof Walkways: Install walkway roof pavers according to roofing manufacturer's written instructions in locations indicated, to form walkways. Clean roof membrane surface with Low volatile primer. Adhere walkways with asphaltic mastic.

3.11 FIELD QUALITY CONTROL

- A. Correct identified defects or irregularities.
- B. Manufacturer Inspection Service:
 - 1. Prior to, during installation and at completion of the installation, inspections must be made by a representative of the manufacturer in order to ascertain that the roofing system has been installed according to their published specifications, standards and details.
 - 2. Keep the Architect and Owner informed as to the progress and quality of the Work as observed.
 - 3. Provide job site inspections:
 - a. Minimum of one 4-hour workday per week.
 - b. Provide a written daily report when onsite indicating the exact hours present.
 - 4. Report to the Architect in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
- C. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
- D. Electric Field Vector Mapping (EFVM): Testing agency shall survey entire roof area for potential leaks using electric field vector mapping (EFVM).
- E. Final Roof Inspection: Arrange for roofing system manufacturer's trained technician to inspect roofing installation before flood coat is applied upon completion and submit report to Architect.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
 - 2. There will be no deviation from this Section, without prior written consent of the Architect and manufacturer, who will have the option of refusing to accept the installation.
 - 3. Confirm that the manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.
 - 4. Repair of Deficiencies: Installations or details noted as deficient during Final Inspection must be repaired and corrected by applicator, and made ready for reinspection, within five working days.
 - 5. Warranty will be issued upon approval of the installation.
- F. Roofing system will be considered defective if it does not pass tests and inspections.
 - 1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect roofing membrane from damage and wear during remainder of construction period.
- B. For roof areas that are to remain intact and that are subject to foot traffic and damage, provide temporary wood walkways with notches in sleepers to permit free drainage. Provide fiberboard cover over roofing membrane under temporary wood walkways and adjacent areas; round all edges and corners of wood bearing on roof surface. Receive approval from roofing material manufacturer technician before any traffic is permitted over any new roofing.
- C. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- D. Correct deficiencies in or remove roofing that does not comply with requirements, repair substrates, and repair or reinstall roofing to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

- E. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
- F. Protect building surfaces against damage from roofing Work.
- G. Prevent materials from entering or clogging drains and conductors.
- H. Replace or restore other Work damaged by installations of the roofing system.
- I. Protection of Property:
 - 1. Provide protection of property during course of roofing Work.
 - 2. Protect lawns, shrubbery, paved areas, and building from damage; necessary repair of damages will be at no extra cost to Owner.

PART 4 - INSTALLER'S WARRANTY CONDITIONS

WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

- Owner:
- Address:
- Building Name/Type:
- Address:
- Area of Work:
- Acceptance Date:
- Warranty Period:
- Expiration Date:

AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

This Warranty is made subject to the following terms and conditions:

Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

- lightning;
- peak gust wind speed exceeding ___ mph;
- fire;
- failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
- faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
- vapor condensation on bottom of roofing; and
- activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, 201__.

Authorized Signature:
Name:

END OF SECTION

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following sheet metal flashing and trim:
 - 1. Manufactured reglets.
 - 2. Formed wall flashing and trim.
 - 3. Exposed trim not part of other assemblies.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.
 - 1. Include similar samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Sheet Metal Flashing: 12 inches long. Include fasteners, closures, and other attachments.
 - 2. Trim: 12 inches long. Include fasteners and other exposed accessories.
 - 3. Accessories: Full-size Sample.

1.4 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- B. Mockups: Demonstrate aesthetic effects and set quality standards for fabrication and installation, as appropriate within wall construction mockups required under other sections.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, and roof-mounted equipment.
 - 2. Review methods and procedures related to sheet metal flashing and trim.
 - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.6 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 PRODUCTS

2.1 SHEET METALS

- A. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:
 - 1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.
 - b. Color: Match Architect's samples.
 - 2. Aluminum Thickness: Fabricate components not specified under other Sections or indicated on Drawings, from coil stock minimum thickness 0.040 inch.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
 - 1. Finish: No. 2D (dull, cold rolled).
 - 2. Through-wall: Minimum 0.0156 inch thick.

- C. Cast Stone Coping Cap Flashing: 26 gage Type 304 stainless steel; natural and cast stone locations.
 - 1. STF Metal Sawtooth Flashing by Hohmann and Barnard, Inc.
 - 2. Mortar Tight by LITSCO.
 - 3. 3-Way Bonding Coping by B & B Sheet Metal.

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
 - 2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 - 3. Blind Fasteners: High-strength stainless-steel rivets.
- C. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 MANUFACTURED COUNTERFLASHINGS AND REGLETS

- A. Available Manufacturers:
 - 1. Fry Reglet Corporation.
 - a. Heckmann Building Products Inc.
 - b. OMG Edge Metal.
 - c. Keystone Flashing Company, Inc.
 - d. Sandell Manufacturing Company, Inc.
 - 2. Material: Stainless steel, 0.0187 inch thick.
 - 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 - 4. Masonry Type: Provide with top flange to set in mortar joint; bent leg to resist pull-out.
 - 5. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.

2.5 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- long, but not exceeding 12 foot long, sections, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch- high end dams. Fabricate from the following material:
 - 1. Stainless Steel: 0.0156 inch thick.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
 - 1. Coat side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 - 2. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
 - 1. Aluminum: Use aluminum or stainless-steel fasteners.
 - 2. Stainless Steel: Use stainless-steel fasteners.
- H. Seal joints sealant as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Prein edges of sheets to be soldered to a width of 1-1/2 inches except where pretinned surface would show in finished Work.
 1. Do not solder prepainted, metallic-coated steel and aluminum sheet.
 2. Stainless-Steel Soldering: Prein edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.
 3. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.
 - J. Aluminum Flashing: Rivet or weld joints in uncoated aluminum where necessary for strength.
- 3.3 WALL FLASHING INSTALLATION
- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- 3.4 CLEANING AND PROTECTION
- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
 - B. Clean and neutralize flux materials. Clean off excess solder and sealants.
 - C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
 - D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 71 00 - MANUFACTURED ROOF SPECIALTIES**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following manufactured roof specialties:
 - 1. Copings.
 - 2. Roof edge flashings.
 - 3. Prefabricated roof expansion joint covers.
 - 4. Underlayment (transition) membrane materials.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Manufacture and install manufactured roof specialties to resist thermally induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Thermal Movements: Provide manufactured roof specialties that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Water Infiltration: Provide manufactured roof specialties that do not allow water infiltration to building interior.
- D. SPRI Wind Design Standard: Manufacture and install copings and roof-edge flashings tested according to ANSI/SPRI/FM 4435/ES-1 and capable of resisting the project specific design pressures per IBC.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Qualification data for manufacturer and qualified professional engineer licensed in the State of Maryland.
- C. Shop Drawings: Show layouts of manufactured roof specialties, including plans and elevations. Identify factory- vs. field-assembled work. Include the following:
 - 1. Details for fastening, joining, supporting, and anchoring manufactured roof specialties including fasteners, clips, cleats, and attachments to adjoining work.
 - 2. Details for expansion and contraction.
 - 3. Details of termination points and assemblies, including fixed points.
 - 4. Details of special conditions.
- D. Fabrication Samples: For copings and roof edge flashings made from 12-inch lengths of full-size components including fasteners, cover joints, accessories, and attachments.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, verifying compliance of copings and roof edge flashings with performance requirements.

F. Certifications:

1. Provide certification from roofing manufacturer stating systems of this section will be accepted within the roofing system warranty.
2. Provide manufacturer certificate confirming compliance with provisions of this section and others required by the roofing manufacturer.

1.4 QUALITY ASSURANCE

- A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- B. Manufacturer Qualifications: Manufacturer capable of providing product certification and field service representation during construction.
 1. Company with a minimum of ten years of continuous experience manufacturing perimeter metal systems of the type specified and capable of providing the following information.
 2. List of five other projects of similar size, including approximate date of installation and name of architect for each.
- C. Product Qualifications: Products must be accepted by roofing manufacturer within the total system warranty and listed by name on the roofing manufacturer's letterhead.
- D. Preinstallation Conference: Installer and manufacturer's representative to participate in roofing system preinstallation conference.

1.5 COORDINATION

- A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.6 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace manufactured roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- B. Special Warranty for Wind Resistance:
 1. Manufacturer shall guarantee that a standard size roof edge system, when installed per manufacturer's instructions, will not blow off, leak, or cause membrane failure, even in wind conditions up to 110 mph, or the manufacturer shall at their option repair or replace their materials.
 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 3. Basis-of-Design Product: The designs for copings and roof edge flashings are based on the products named. Subject to compliance with requirements, provide either the named products or comparable products by one of the other manufacturers specified.
 4. Roofing manufacturer can supply copings and gravel stops if they comply with all product specification requirements.

2.2 EXPOSED METALS

- A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and finish indicated, finished as follows:
1. Surface: Smooth, flat finish.
 2. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Exterior Finish: Fluoropolymer 2-Coat Coating System - Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat (containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers' written instructions.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Exterior Finish: Fluoropolymer 2-Coat Coating System - Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat (containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers' written instructions.

2.3 CONCEALED METALS

- A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.
- C. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
- C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 COPINGS

- A. Copings: Manufactured coping system consisting of formed aluminum coping cap in section lengths not exceeding 12 feet, concealed anchorage, concealed splice plates with same finish as coping caps, one-piece corner units, and end cap units.
 - 1. Available Products: Flush face design with concealed (blind) drip.
 - a. Rapid-Lok Coping with concealed drip option by ATAS International, Inc.
 - b. Permasnap Plus Coping by OMG Edge Metal.
 - c. PAC-TITE Gold Coping by PAC-CLAD Petersen, a Carlisle Company.
 - d. Creative Design Series Coping by Metal-Era, refer to Drawings for profile.
 - e. Roofing Manufacturer.
 - 2. Basis-of-Design Product - Special Profiles: Refer to Drawings for custom profile.
 - a. Rapid-Lok (Custom) by ATAS International, Inc.
 - b. Custom product of OMG Edge Metal.
 - c. Creative Design Series Coping by Metal-Era.
 - d. Custom product of Roofing Manufacturer.
 - 3. Coping Caps: Snap-on, fabricated from the following exposed metal:
 - a. Aluminum: 0.063 inch thick.
 - 4. Coping Cap Color: Custom color match to Metal Wall Panels; Section 07 42 13.
 - 5. Corners: Continuously welded; field verify actual constructed angles for factory-fabricated project-specific prefabricated corners.
 - 6. Transitions: Provide project-specific factory-fabricated continuously welded transitions including, but not limited to, transition miters, "z"-miters (steps in exterior wall 18 inches or less), tee miters, end terminations and end caps.
 - 7. Coping Anchor Chairs: Concealed design standard for named products, with integral cleats.

2.6 ROOF EDGE FLASHINGS

- A. Roof Edge Fascia: Manufactured, three-piece, roof edge fascia consisting of snap-on aluminum fascia cover in section lengths not exceeding 12 feet, concealed joint splice, and a continuous extruded aluminum retainer, with integral cleat.
 - 1. Available Products: Flush face design, with concealed (blind) drip.
 - a. Rapid-Lok Extruded Fascia by ATAS International, Inc. (Single-Ply Membranes Only).

- b. TerminEdge EX by OMG Edge Metal.
 - c. PAC-TITE WT Fascia by PAC-CLAD Petersen, a Carlisle Company.
 - d. Anchor-Tite HG Fascia by Metal-Era.
 - e. Roofing Manufacturer.
2. Basis-of-Design Product - Special Profiles: Refer to Drawings for custom profile.
 - a. Rapid-Lok Extruded Fascia (Custom) by ATAS International, Inc. (Single-Ply Membranes Only).
 - b. Custom product of OMG Edge Metal.
 - c. Creative Design Series by Metal-Era.
 - d. Custom product of Roofing Manufacturer
 3. Fascia Cover: Fabricated from the following exposed metal:
 - a. Aluminum: Minimum 0.063 inch thick.
 4. Fascia Cover Color: Custom color match to Metal Wall Panels; Section 07 42 13.
 5. Provide matching mitered and welded corner units; field verify actual constructed angles for factory-fabricated project-specific prefabricated corners.
 6. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.

2.7 PREFABRICATED ROOF EXPANSION JOINT COVER

A. Available Products:

1. Perma-Tite Expansion Joint by Metal Era.
2. Permaspan Expansion Joint by OMG Edge Metal.
3. Roofing manufacturer.

B. Characteristics:

1. Formed metal cap; concealed joint cover and gutter chair.
 - a. Material: 0.063-inch Aluminum; finish (type and color) to match coping.
2. 20 gage galvanized steel articulating cleat.
3. Predrilled for shouldered fasteners 18 inches o.c. on both curbs.
4. Provide with in-joint condensate seal and insulation.

2.8 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
 3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:
 - a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Owens Corning; WeatherLock Metal High Temperature Underlayment.
- B. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

2.9 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
- B. Examine walls, roof edges, and parapets for suitable conditions for manufactured roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water. Overlap edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
- B. Slip Sheet: Install with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

3.3 INSTALLATION

- A. General: Install manufactured roof specialties according to manufacturer's written instructions. Anchor manufactured roof specialties securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.
 - 1. Install manufactured roof specialties with provisions for thermal and structural movement.
 - 2. Torch cutting of manufactured roof specialties is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of self-adhering, high-temperature sheet underlayment.
- C. Install manufactured roof specialties level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.
- D. Install manufactured roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
- E. Expansion Provisions: Provide for thermal expansion of exposed manufactured roof specialties. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections.

- F. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- G. Seal joints with elastomeric sealant as required by manufacturer of roofing specialties, for watertight assembly.

3.4 COPING INSTALLATION

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings to resist uplift and outward forces according to performance requirements.
 - 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's recommended spacing.

3.5 ROOF EDGE FLASHING INSTALLATION

- A. Install cleats, cant dams, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings to resist uplift and outward forces according to performance requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess sealants.
- B. Remove temporary protective coverings and strippable films as manufactured roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings and pieces of flashing. Maintain in a clean condition during construction.
- C. Replace manufactured roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 71 23 - GUTTERS AND DOWNSPOUTS**PART1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Pre-fabricated aluminum gutters and downspouts.
- B. Related Sections include the following:
 - 1. Division 7 Section "Sheet Metal Flashing and Trim" for flashings and other sheet metal work.
 - 2. Division 7 Section "Manufactured Roof Specialties" for fasciae and copings.
 - 3. Division 7 Section "Joint Sealants" for field-applied sealants not otherwise specified in this Section.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 - 2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International: ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. Federal Specification Unit: FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- D. Sheet Metal and Air Conditioning Contractors' National Association, Inc.: SMACNA - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- B. Product Data: Submit data on manufactured components, materials, and finishes.
- C. Samples: Submit two samples, 24 inches long illustrating component design, finish, color, and configuration.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA Manual; maintain one copy of manual on site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack products to prevent twisting, bending, and abrasion, and to provide ventilation; slope to drain.
- B. Prevent contact with materials during storage capable of causing discoloration, staining, or damage.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. SPRI Wind Design Standard: Manufacture and install roof-edge flashings tested according to ANSI/SPRI/FM 4435/ES-1 and capable of resisting the project specific design pressures per IBC.

2.2 GUTTERS AND DOWNSPOUTS

- A. Available Manufacturers:
 - 1. Berger Building Products Corp.
 - 2. Metal-Era.
 - 3. OMG Roofing Products.
 - 4. Roof Drainage Components and Accessories, Inc.
- B. Product Description:
 - 1. Gutters: SMACNA Rectangular style profile; Figure 1-2, Style F.
 - 2. Downspouts: SMACNA round profile; Figure 1-32A.

2.3 COMPONENTS

- A. Pre-Finished Aluminum Sheet:
 - 1. ASTM B209, manufacturer's standard alloy and temper for specified finish; shop pre-coated with three coat PVDF (polyvinylidene fluoride) coating.
 - a. Gutters: 0.050 inch thick.
 - b. Downspouts: 0.050 inch thick.
 - 2. Color: Match Architect's sample.

2.4 ACCESSORIES

- A. Anchors and Supports: Profiled to suit gutters and downspouts.
 - 1. Anchoring Devices: In accordance with SMACNA requirements.
 - 2. Gutter Supports: Brackets and straps sized per SMACNA Table 1-8.
 - 3. Downspout Supports: Brackets; SMACNA Figure 1-35E.
- B. Strainers: 15 gage stainless steel wire baskets.
- C. Fasteners: Aluminum or Stainless steel, with EPDM washers.
- D. Protective Backing Paint: FS TT-C-494, Bituminous.

2.5 FABRICATION

- A. Form gutters and downspouts of profiles and sizes indicated.
- B. Fabricate with required connection pieces.
- C. Form sections to shape indicated on Drawings, square, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance; allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.6 FACTORY FINISHING

- A. PVDF (polyvinylidene fluoride) Coating: Multiple coat, thermally cured, fluoropolymer system conforming to AAMA 2605.
- B. Color: Custom to match Architect's sample.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Verify surfaces are ready to receive gutters and downspouts.

3.2 PREPARATION

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mils.

3.3 INSTALLATION

- A. Join lengths with formed seams sealed watertight.
- B. Support Spacing:
 - 1. Gutters:
 - a. Brackets: 36 inch o.c.
 - b. Straps: 36 inch o.c. offset 18 inches o.c. of bracket locations.
 - 2. Downspouts: SMACNA Figure 1-35.
- C. Flash and seal gutters to downspouts and accessories.
- D. Slope gutters minimum 1/16 inch per foot.
- E. Provide gutter slip joints every 20 feet in length for contraction and expansion; seal joints with sealant of matching color.
- F. Set downspouts plumb and not less than 1 inch from the wall.
- G. Provide leaders to connect gutters on overhanging eaves to downspouts; set leaders with a slope not less than 1/16 inch per foot or more than 30 degrees below a horizontal line.
- H. Fit leaders over the outlet tube in gutter bottom riveted to the downspout; rivet spacing shall be not more than 2 inches.
- I. Set strainers loosely in the outlet tube opening in gutter.
- J. Make joints between lengths of downspouts by telescoping the end of the upper lengths at least 3/4 inch into the lower length.

END OF SECTION

SECTION 07 72 00 - ROOF ACCESSORIES**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Roof curbs.
 - 2. Equipment supports.
 - 3. Prefabricated and engineered fixed wall ladders with roof parapet return without cage and high parapet access configurations.
 - 4. Pipe portals.

1.2 SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.
- C. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 - 1. Size and location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof or building structure.
 - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
- D. Delegated Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation; code compliant.

1.3 QUALITY ASSURANCE

- A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

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, manufacturers listed in other Part 2 articles.

2.2 METAL MATERIALS

- A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755.
 - 1. Galvanized Steel Sheet: ASTM A 653, G90 coated.
 - 2. Exposed Finishes:
 - a. Roof Curbs, Equipment Curbs and Pipe Supports: Manufacturer's standard powder coat.
- B. Steel Shapes: ASTM A 36, hot-dip galvanized to comply with ASTM A 123, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.
- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- C. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.
- D. Gaskets: Manufacturer's standard tubular or fingered design of EPDM, or PVC; or flat design of foam rubber.
- E. Elastomeric Sealant: ASTM C 920, polyurethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.4 ROOF CURBS

- A. Roof Curbs: Provide metal roof curbs, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Fabricate with welded or sealed mechanical corner joints, with stepped integral metal cant raised the thickness of roof insulation and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
 - 1. Available Manufacturers:
 - a. Custom Curb, Inc.
 - b. LM Curbs.
 - c. Pate Company (The).
 - d. Roof Products & Systems Corporation.
 - e. Roof Products, Inc.
 - f. ThyCurb; Div. of Thybar Corporation.
 - 2. Load Requirements: Indicated on Drawings.
 - 3. Material: Galvanized steel sheet, 14 gage thick.
 - a. Finish: High-performance organic coating.

4. Liner: Same material as curb, of manufacturer's standard thickness and finish.
5. Factory install wood nailers at tops of curbs.
6. Factory insulate curbs with 1-1/2-inch thick, glass-fiber board insulation.
7. Curb height may be determined by adding thickness of roof insulation and minimum base flashing height recommended by roofing membrane manufacturer. Fabricate units to minimum height of 10 inches, unless otherwise indicated.
8. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.5 EQUIPMENT SUPPORTS

- A. Equipment Supports: Provide metal equipment supports, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Fabricate with welded or sealed mechanical corner joints, with stepped integral metal cant raised the thickness of roof insulation and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
1. Available Manufacturers:
 - a. Custom Curb, Inc.
 - b. LM Curbs.
 - c. Pate Company (The).
 - d. Roof Products & Systems Corporation.
 - e. Roof Products, Inc.
 - f. ThyCurb; Div. of Thybar Corporation.
 2. Load Requirements: Indicated on Drawings.
 3. Material: Galvanized steel sheet, 14 gage thick.
 - a. Finish: High-performance organic coating.
 4. Factory-install continuous wood nailers at tops of equipment supports.
 5. Metal Counterflashing: Manufacturer's standard removable counterflashing, fabricated of same metal and finish as equipment support.
 6. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
 7. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.6 PREFABRICATED AND ENGINEERED FIXED WALL LADDERS WITH ROOF PARAPET RETURN WITHOUT CAGE AND HIGH PARAPET ACCESS CONFIGURATIONS

- A. Manufacturers:
1. O'Keeffe's Inc.
 2. Royalite Manufacturing Inc.
 3. ALACO.
 4. Precision Ladders.
- B. Type: Prefabricated fixed wall ladders with parapet return.
- C. Materials:
1. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.
 2. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.
- D. Fabrication:
1. Ladder: Side rails with minimum 29 mm (1-1/8 inch) round rungs that are serrated and secured with cast aluminum connectors, 4 solid rivets and minimum 9.5 mm (3/8 inch) thick brackets mounted to the walls.

2. Provide minimum 72-inch high, hinged security door with padlock hasp at foot of ladder to prevent unauthorized ladder use.
3. Finish: Clear Anodic Finish: AA-M10C22A41 Mechanical finish as fabricated. Architectural Class I, clear coating 0.018 mm or thicker.

2.7 PIPE PORTALS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:
 1. Custom Solution Roof and Metal Products.
 2. Pate Company.
 3. Roof Products, Inc.
 4. Thaler Metal.
- B. Curb-Mounted Pipe Portal: Insulated roof-curb units with welded or mechanically fastened and sealed corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom; with weathertight curb cover with single or multiple collared openings and pressure-sealed conically shaped EPDM protective rubber caps sized for piping indicated, with stainless-steel snaplock swivel clamps.
- C. Flashing Pipe Portal: Formed aluminum membrane-mounting flashing flange and sleeve with collared opening and pressure-sealed conically shaped EPDM protective rubber cap sized for piping indicated, with stainless-steel snaplock swivel clamps.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
 2. Verify dimensions of roof openings for roof accessories.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Install roof accessories to fit substrates and to result in watertight performance.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 1. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
 2. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.
- D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
- E. Roof Curb Installation: Set roof curb so top surface of roof curb is level.

- F. Equipment Support Installation: Set equipment support so top surface of equipment support is level.
- G. Seal joints with elastomeric sealant as required by manufacturer of roof accessories.

3.3 CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION

SECTION 07 81 00 - APPLIED FIREPROOFING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Fireproofing of interior structural steel not exposed to damage or moisture.
- B. Preparation of fireproofing for application of exposed finish specified elsewhere.

1.2 REFERENCE STANDARDS

- A. ASTM E605 - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2011).
- B. ASTM E736 - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2000 (Reapproved 2011).
- C. ASTM E760/E760M - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2015)e1.
- D. ASTM E761 - Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2011).

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data indicating product characteristics.
- C. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, as follows:
 - 1. Bond strength.
 - 2. Bond impact.
 - 3. Compressive strength.
 - 4. Fire tests using substrate materials similar those on project.
- D. Field Quality Control Submittals: Submit field test report.
- E. Manufacturer's Certificate: Certify that sprayed-on fireproofing products meet or exceed requirements of contract documents.
- F. Manufacturer Reports: Indicate environmental conditions that applied fireproofing materials were installed.

1.4 FIELD CONDITIONS

- A. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F or when temperature is predicted to be below said temperature for 24 hours after application.
- B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.
- C. Provide temporary enclosure to prevent spray from contaminating air.

1.5 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.

1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Carboline Company: www.carboline.com.
 1. Concealed Applications: Pyrolite 15.
 2. Exposed Applications: Pyrocrete 22.
- B. GCP Applied Technologies: www.gcpat.com.
 1. Concealed Applications: Monokote Type MK-6/CBF.
 2. Exposed Applications: Monokote Type Z106.
- C. Isolatek International Inc: www.isolatek.com.
 1. Concealed Applications: Cafco 300.
 2. Exposed Applications: Cafco 400.

2.2 MATERIALS

- A. Low Density Sprayed Fire-Resistive Material: Factory mixed, cementitious material blended for uniform texture with vermiculite or lightweight synthetic aggregate, and conforming to the following requirements:
 1. Bond Strength: ASTM E 736, 200 psf when set and dry.
 2. Bond Impact: ASTM E 760, no cracking, flaking or delamination.
 3. Dry Density: ASTM E 605, minimum average density of 14 lb/cu ft, with minimum individual density of any test sample of 13 lb/cu ft.
 4. Compressive Strength: ASTM E 761, minimum 1,440 psi.
 5. Surface Burning Characteristics: Maximum flame spread of 0 and maximum smoke developed of 0, when tested in accordance with ASTM E 84.
 6. Location: Concealed locations.
- B. Medium Density Sprayed Fire-Resistive Material: Factory mixed, Portland cement blended for uniform texture with mineral aggregates or mineral fibers and additives, without chlorides, approved for exterior use and conforming to the following requirements:
 1. Bond Strength: ASTM E 736, 2000 psf when set and dry.
 2. Bond Impact: ASTM E 760, no cracking, flaking or delamination.
 3. Dry Density: ASTM E 605, minimum density of 21 lb/cu ft.
 4. Compressive Strength: ASTM E 761, minimum 7,344 psi.
 5. Surface Burning Characteristics: Maximum flame spread of 0 and maximum smoke developed of 0, when tested in accordance with ASTM E 84.
 6. Location: Exposed interior locations.
 - a. All exposed areas to receive Cafco Black Bond Seal, or equivalent of other named fireproofing manufacturers.

2.3 ACCESSORIES

- A. Primer Adhesive: Of type recommended by fireproofing manufacturer; comply with low-emitting requirements specified in Section 01 61 16.
- B. Overcoat: As recommended by manufacturer of applied fireproofing material.
- C. Metal Lath: Expanded metal lath; minimum weight of 1.7 psf, galvanized finish.
- D. Water: Clean, potable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive fireproofing.
- B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- D. Verify that voids and cracks in substrate have been filled.
- E. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.2 PREPARATION

- A. Perform tests as recommended by fireproofing manufacturer in applications where adhesion of fireproofing to substrate is in question.
- B. Remove incompatible materials that could effect bond by scraping, brushing, scrubbing, or sandblasting.
- C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- D. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- E. Close off and seal duct work in areas where fireproofing is being applied.

3.3 APPLICATION

- A. Install metal lath over structural members as indicated or as required by UL Assembly Design Numbers.
- B. Apply primer adhesive in accordance with manufacturer's instructions.
- C. Apply fireproofing in uniform thickness and density as necessary to achieve required ratings.
- D. Apply fireproofing in sufficient thickness to achieve required ratings, with as many passes as necessary to cover with monolithic blanket of uniform density and texture.
- E. In exposed locations, trowel surface smooth and form square edges, using tools and procedures recommended by fireproofing manufacturer; apply black sealer.

3.4 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 40 00 - Quality Requirements.
- B. Inspect installed fireproofing after application and curing for integrity, prior to its concealment.
 - 1. Submit field test reports promptly to Contractor and Architect.
- C. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of authorities having jurisdiction (AHJ).
- D. Repair or replace applied fireproofing at locations where test results indicate fireproofing does not meet specified requirements.
- E. Provide independent third-party inspection of the installed fireproofing after application and curing for integrity, prior to its concealment. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings.

- F. Re-inspect installed fireproofing for integrity of fire protection, after installation of subsequent Work.
- G. Independent third-party inspector to re-inspect the installed fireproofing for integrity of fire protection, after installation of subsequent Work.
- H. Repair or replace any damaged areas of fireproofing.

3.5 CLEANING

- A. Remove excess material, overspray, droppings, and debris.
- B. Remove fireproofing from materials and surfaces not required to be fireproofed.
- C. At exposed fireproofing, clean surfaces that have become soiled or stained, using manufacturer's recommended procedures.

END OF SECTION

SECTION 07 81 23 - INTUMESCENT FIREPROOFING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Spray application of intumescent fire resistive coatings on interior, exposed structural steel with flange columns, beams, pipe columns, and related exposed structural steel to provide rated fireproofing.
- B. In areas of fire rated construction where structural steel is exposed, the integrity of the rating to be maintained by protecting the steel with intumescent fire resistive coatings; where steel is concealed, it will be protected by applied fireproofing (Section 07 81 00).

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.
 - 1. Steel surfaces with less than 3 feet clear working access may necessitate applying material to inaccessible surfaces prior to erection of the finished steel members, either at the point of fabrication or on-site.
 - 2. Coordinate sequence of Work with other trades.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Performance characteristics and test results.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Manufacturer's Installation Instructions: Submit information including special procedures, and conditions requiring special attention.
- D. Manufacturer's Certificate:
 - 1. Certify applied fireproofing products meet or exceed specified requirements.
 - 2. Certify acceptance of steel primer.
- E. Submit certified test reports indicating the following:
 - 1. Fire test reports of fireproofing application to substrate materials, including primers, similar to Project conditions, conducted in conformance to ASTM E 84 and ASTM E 119.
 - 2. UL Design Listings from Underwriters Laboratories, Inc.
- F. Submit applicator's current certification, by product manufacturer, as a factory trained and manufacturer approved installer of this product.
- G. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For paints and coatings, if applicable: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 4: BPDO - Material Ingredients
 - a. For paints and coatings, if available: Material Ingredient Report.
 - 3. EQ Credit 2: Low-Emitting Materials

- a. For interior wet-applied paints and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
- H. Contract Closeout Submittals:
1. Manufacturer's Field Reports: Indicate compliance with manufacturer's installation instructions and Contract Documents.
 2. Contractor's Certificate: Provide certification to the Owner and the Architect at the completion of the Contract that the applied fireproofing is complete at all required locations and in conformance with the methods and materials of the appropriate UL Test Report.

1.4 QUALITY ASSURANCE

- A. Qualifications:
1. Manufacturer: Company specializing in manufacturing products specified in this Section, with minimum five years experience.
 2. Applicator: Company specializing in performing Work of this Section, with minimum five years experience and approved by manufacturer.
- B. Product: Manufactured under UL or Warnock Hersey Follow Up Program; each container or package to bear UL or Warnock Hersey label.
- C. Regulatory Requirements:
1. Conform to applicable code for fire resistance ratings.
 2. Submit certification of acceptability of fireproofing materials to authority having jurisdiction and to Architect.

1.5 MOCK-UP

- A. Apply system to a column or beam selected by the Architect.
- B. Examine installation to determine variances from specified requirements.
- C. Receive Architect's approval prior to proceeding with Work; mock-up will serve a standard to installation and finish for remainder of Project.
- D. Incorporate accepted mock-up as part of Work.

1.6 FIELD CONDITIONS

- A. Do not apply sprayed intumescent fireproofing when temperature of substrate and surrounding air is below 50 degrees F.
- B. Do not apply when surface temperature is less than 5 degrees F above the dew point.
- C. Provide ventilation in areas to receive fireproofing during and 72 hours, minimum, after application, to dry materials.
- D. Relative humidity in work area must not exceed 75 percent throughout the total period of application and drying for the intumescent fireproofing, and must not exceed 65 percent throughout the application and drying for the protective decorative finish coat; relative humidity of 40 percent to 60 percent is recommended in work area.
- E. Maintain non-toxic, unpolluted working area; provide temporary enclosure to prevent spray from contaminating air.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide two year manufacturer's warranty.

- C. Provide one year applicator's warranty.
- D. Warranty:
 - 1. Fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation and blistering.
 - 2. Reinstall or repair such defects or failures.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Provide fire rated assemblies to hourly rating or UL Design indicated on Drawings; when indicated by hourly rating, intumescent coating manufacturer will determine and submit an appropriate UL tested design.
- B. Primer: Type recommended or approved by fireproofing manufacturer.
- C. Topcoat: Suitable for application over applied fireproofing; of type recommended in writing by fireproofing manufacturer for each fire-resistance design.
- D. Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.

2.2 INTUMESCENT FIRE RESISTIVE COATINGS

- A. Field-Applied Coating: Steel indicated to receive intumescent fire-resistive coatings and not particularly indicated to have shop-applied coatings. Contractor also has the option of shop-applying all intumescent coatings at his discretion.
 - 1. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:
 - a. Albi Manufacturing, Division of StanChem, Inc.; Albi Clad TF.
 - b. International Paint Limited, subsidiary of Akzo Nobel N.V.; Interchar 1120.
 - c. Isolatek International; Cafco SprayFilm WB 5.
 - d. Sherwin-Williams Company; Firetex FX5120.
 - 2. Application: Designated for "conditioned interior space purpose" use by a qualified testing agency acceptable to authorities having jurisdiction.
 - 3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design.
 - 4. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - 5. Hardness: Not less than 60, Type D durometer, according to ASTM D 2240.
 - 6. Finish: Spray-applied, back-rolled and sanded; appearance may be minor orange peel.
 - a. Color and Gloss: Match Architect's sample.
- B. Shop-Applied Coatings: Provide at locations specifically indicated to be shop-applied finish; all steel indicated to receive intumescent fire-resistive coatings may have the coating shop-applied, at the contractor's decision, and mars repaired in the field following transport and erection.
 - 1. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work under this Contractor Option include:
 - a. Interchar 212 manufactured by International Paint LLC.
 - b. Pitt Char by PPG Coatings.
 - c. THERMO-LAG 3000 by Carboline.

2. Finish: High decorative finish; spray-applied, back-rolled and sanded. Appearance may be minor orange peel.
 - a. Basis-of-Design: Finish Standard No. 3 of International Paint LLC.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify surfaces are ready to receive intumescent coatings.
- B. Verify clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify ducts, piping, equipment, or other items interfering with application of fireproofing have not been installed.
- D. Verify voids and cracks in substrate have been filled and projections have been removed where intumescent coatings will be exposed to view as finish material.
- E. Verify roof traffic has ceased and roof mounted equipment is in place.
- F. Confirm compatibility of surfaces to receive fireproofing materials; steel surfaces should be primed with a compatible primer.
- G. Beginning of installation means acceptance of project conditions.

3.2 PREPARATION

- A. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.
- B. Remove incompatible materials affecting bond by scraping, brushing, scrubbing, or sandblasting.
- C. Prepare substrates to receive intumescent coatings; Commercial Blast Cleaning (SSPC-SP6/NACE No. 3) is recommended for minimum surface preparation; weld flashes should be ground smooth prior to commencement of application.
- D. Seal all penetrations or open ended fireproofing termination by chamfering at a 45 degree angle and sealing with high heat silicone sealant.
- E. Install reinforcement over structural members as indicated on Drawings, or UL Fire Resistance Directory Listings.
- F. Apply intumescent coatings manufacturer's recommended bonding agent on primed steel.
- G. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- H. Close off and seal duct work in areas where fireproofing is being applied.

3.3 APPLICATION

- A. Apply primer according to primer manufacturer's recommendations; provide primer "cut-back" 3 inches for bolted connections and 12 inches for welded connections.
- B. Apply intumescent base coat in sufficient thickness to achieve required fire ratings, with as many passes as necessary to cover with monolithic blanket of uniform appearance.
- C. Apply color coat at rate recommended by fireproofing manufacturer.
- D. Patch damaged Work.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection:

1. Provide independent third-party inspection of the installed intumescent coating after application and curing for integrity. Ensure that actual thicknesses and bond strengths meet requirements for specified ratings.
 2. Verification of thickness is to be conducted in accordance with "Technical Manual 12B, Standard Practice for the Testing and Inspection of Field Applied Thin-Film Intumescent Fire-Resistive Materials; an Annotated Guide," published by the Association of the Wall and Ceiling Industries - International.
 3. Independent third-party inspector to re-inspect the installed intumescent coating for integrity of fire protection, after installation of subsequent Work.
 4. Repair or replace any damaged areas of intumescent coating.
- B. Manufacturer's Field Services:
1. Observe site conditions, conditions of surfaces and installation, quality of workmanship, and initiate instructions when necessary.
 2. Manufacturer's Field Reports: A representative directly employed by the manufacturer will document above observations; include environmental conditions under which fireproofing materials were installed.
- C. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
1. Test and inspect as required by the IBC, 1704.11.
- D. Correct unacceptable Work and provide further inspection to verify compliance with requirements, at no additional cost.
- 3.5 ADJUSTING
- A. Patch fireproofing, which has been cut away to facilitate work of other trades, so as to maintain complete coverage of full thickness on appropriate substrate.
- 3.6 CLEANING
- A. Remove excess material, overspray, droppings, and debris.
 - B. Remove fireproofing from materials and surfaces not specifically required to be fireproofed.
- 3.7 PROTECTION
- A. Protect adjacent surfaces and equipment from over-spray of sprayed materials.
 - B. Protect installed intumescent fireproofing from damage due to subsequent construction activities, so fireproofing is without damage or deterioration at time of Substantial Completion.
 - C. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 84 00 - FIRESTOPPING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of all openings, joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not.
- C. Smoke seals to be accomplished with materials specified by this section.
- D. Fill annular space around penetrating objects with materials specified by this section.

1.2 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a.
- C. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems; 2007 (Reapproved 2011).
- D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestops; 2014b.
- E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers; 2010a (Reapproved 2015).
- F. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2015b.
- G. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013.
- H. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- I. ITS (DIR) - Directory of Listed Products; current edition.
- J. FM 4991 - Approval Standard for Firestop Contractors; 2013.
- K. FM (AG) - FM Approval Guide; current edition.
- L. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).
- M. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.
- N. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- O. UL (DIR) - Online Certifications Directory; Current Edition.
- P. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

1. Include product test reports of qualified testing agency.
- D. Sustainable Design Submittal: Submit VOC content documentation for all non-preformed materials.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements, including compatibility of all materials in contact with systems.
- F. Certificate from authority having jurisdiction indicating approval of materials used.
- G. Installer Qualification: Submit qualification statements for installing mechanics.

1.4 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping systems of designs that maintain assembly fire ratings when tested in accordance with ASTM E119 and ASTM E814.
 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 1. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:
 - a. Verification of minimum three years documented experience installing work of this type.
 - b. Verification of at least five satisfactorily completed projects of comparable size and type.
 - c. Licensed by local authorities having jurisdiction (AHJ).
 - d. UL Qualified Firestop Contractor.
 2. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to installer engaged by Contractor does not in itself confer qualification on buyer.
- D. Assign installation of firestopping systems to a single qualified installer.
- E. Source Limitations: Obtain firestopping systems, for each kind of joint and construction condition, through one source from a single manufacturer.

1.5 COORDINATION

- A. Coordinate construction of joints, openings and penetrating items to ensure that firestopping systems are installed according to specified requirements.
- B. Coordinate sizing of joints, sleeves, openings, core-drilled holes, or cut openings to accommodate fire-resistive joint systems.
- C. Notify testing agency at least seven days in advance of firestopping system installations; confirm dates and times on day preceding each series of installations.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
 1. Smoke seals to be accomplished with materials specified by this section.

2. Non-Rated Through-Penetration Requirements: At all penetrations in non-rated assemblies, fill annular space around penetrating object with mineral wool and secure in place.
- B. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.
- C. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.
- D. Compatibility: Provide materials that are compatible with joint substrates, under conditions of service and application, as demonstrated by firestopping system manufacturer based on testing and field experience.
- E. Accessories: Provide components of firestopping systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required; use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems selected.

2.2 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
 1. Movement: Provide systems that have been tested to show movement capability as required.
 2. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
 3. Air Leakage: Provide systems that have been tested to show L Rating as required.
 4. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as required.
- B. Head-of-Wall Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
 1. Movement: Provide systems that have been tested to show movement capability as required.
- C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
 1. Movement: Provide systems that have been tested to show movement capability as required.
 2. Air Leakage: Provide systems that have been tested to show L Rating as required.
 3. Watertightness: Provide systems that have been tested to show W Rating as required.
 4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
 2. Air Leakage: Provide systems that have been tested to show L Rating as required.
 3. Watertightness: Provide systems that have been tested to show W Rating as required.
 4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- E. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at 0.30-inch wg at both ambient and elevated temperatures.

2.3 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements.
 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.
 2. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- B. Provide fireproofing systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed; fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
 1. Joints include those installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.
 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
- C. Joints at Exterior Curtain Wall/Floor Intersections:
 1. Provide fire-resistive joint systems with rating determined by ASTM E 119 based on testing at a positive pressure differential of 0.01-inch wg or ASTM E 2307.
 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.
- D. Penetrations in Fire-Resistance-Rated Walls:
 1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls and fire partitions.
 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- E. Penetrations in Horizontal Assemblies:
 1. Horizontal assemblies include floors, floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.
 2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
 3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- F. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Priming:
 - 1. Prime substrates using firestopping manufacturer's recommended products and methods.
 - 2. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
 - 3. Installer must use primer for applications of all firestopping systems regardless if the manufacturer may otherwise relieve the installer of primer use under conditions within acceptable parameters; installer will only be relieved of primer use when manufacturer documents the application to be non-compliant to tested assembly.
- C. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- D. Install labeling required by code.

3.4 IDENTIFICATION

- A. Identify firestopping systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels will be visible to anyone seeking to remove or penetrate firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Firestopping System - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174, and ASTM E2393.
 - 1. Inspecting of completed installations of firestopping systems to take place in successive stages as installation of fire-resistive joint systems proceeds; do not proceed with installation of firestopping systems for the next area until inspecting agency determines completed work shows compliance with requirements.
 - 2. Inspecting agency must state in each report whether inspected firestopping systems comply with or deviate from requirements.
 - 3. Perform additional inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.6 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.7 PROTECTION

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

- B. Provide final protection and maintain conditions during and after installation that ensure firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce firestopping systems complying with specified requirements.

END OF SECTION

SECTION 07 84 46 - FIRE-RESISTIVE JOINT SYSTEMS**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes fire-resistive joint systems for the following:
 - 1. Floor-to-floor joints.
 - 2. Floor-to-wall joints.
 - 3. Head-of-wall joints.
 - 4. Wall-to-wall joints.
 - 5. Perimeter fire-resistive joint systems consisting of floor-to-wall joints between perimeter edge of fire-resistance-rated floor assemblies and exterior curtain walls.
 - 6. Smoke seals.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.
- B. Joint Systems in and between Fire-Resistance-Rated Constructions: Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of construction that they join, and with movement capabilities indicated as determined by UL 2079.
- C. Perimeter Fire-Resistive Joint Systems: For joints between edges of fire-resistance-rated floor assemblies and exterior curtain walls, provide systems of type and with ratings indicated below and those indicated on Drawings, as determined by NFPA 285 and UL 2079.
 - 1. UL-Listed, Perimeter Fire-Containment Systems: Integrity ratings equaling or exceeding fire-resistance ratings of floor or floor/ceiling assembly forming one side of joint.
- D. For fire-resistive systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each fire-resistive joint system, show each kind of construction condition in which joints are installed; also show relationships to adjoining construction. Include fire-resistive joint system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.
- C. Product Certificates: For each type of fire-resistive joint system, signed by product manufacturer.
- D. Qualification Data: For Installer.
- E. LEED Submittals:
 - 1. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives and sealants: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.

1.4 QUALITY ASSURANCE

- A. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single qualified installer.
- B. Source Limitations: Obtain fire-resistive joint systems, for each kind of joint and construction condition indicated, through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide fire-resistive joint systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
 - 1. Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.
 - 2. Fire-resistive joint systems are identical to those tested per methods indicated in Part 1 "Performance Requirements" Article and comply with the following:
 - a. Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.
 - b. Fire-resistive joint systems correspond to those indicated by referencing system designations of the qualified testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fire-resistive joint system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.
- C. VOC content not to exceed 250 g/L.

1.7 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.
- C. Notify Owner's inspecting agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up fire-resistive joint system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector of authorities having jurisdiction have examined each installation.

PART 2 PRODUCTS

2.1 FIRE-RESISTIVE JOINT SYSTEMS

- A. Compatibility: Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.
- B. Accessories:
 - 1. Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article.
 - 2. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.
 - 3. Holding Clips: Minimum 30 gage by 1 inch wide galvanized sheet steel Z-shaped clips to support safing insulation.

2.2 SLAG-WOOL-FIBER/ROCK-WOOL-FIBER BOARD INSULATION

- A. Available Manufacturers:
 - 1. Fibrex Insulations Inc.
 - 2. Owens Corning.
 - 3. Thermafiber.
- B. Unfaced, Slag-Wool-Fiber/Rock-Wool-Fiber Board Insulation: ASTM C 612, maximum flame-spread and smoke-developed indexes of 15 and 0, respectively; passing ASTM E 136 for combustion characteristics.
 - 1. Nominal minimum density of 4 lb/cu. ft.
 - 2. Fiber Color: Regular color, unless otherwise indicated.
 - 3. Fiber Color: Darkened, where indicated.
 - 4. Uses: Where indicated and as fire safing insulation.
- C. Foil-Faced, Slag-Wool-Fiber/Rock-Wool-Fiber Board Insulation: ASTM C 612; faced on 1 side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 25 and 5.
 - 1. Nominal minimum density of 4 lb/cu. ft.
- D. Insulation installed within the waterproofing envelope: comply with low-emitting requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of work.
 - 1. Proceed with installatin only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.

- B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistive joint system materials. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates or damaging adjoining surfaces.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.
- B. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply fill materials so they contact and adhere to substrates formed by joints.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect fire-resistive joint systems and prepare inspection reports.
- B. Testing Services: Inspecting of completed installations of fire-resistive joint systems shall take place in successive stages as installation of fire-resistive joint systems proceeds. Do not proceed with installation of joint systems for the next area until inspecting agency determines completed work shows compliance with requirements.
 - 1. Inspecting agency shall state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.
- C. Remove and replace fire-resistive joint systems where inspections indicate that they do not comply with specified requirements.
- D. Additional inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- E. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and fire-resistive joint systems comply with requirements.

3.5 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or

deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

END OF SECTION

SECTION 07 91 00 - PREFORMED JOINT SEALS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Precompressed foam seals.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's technical data sheets for each product, including chemical composition, movement capability, color availability, limitations on application, and installation instructions.
- C. Samples for Color Selection: 4 inch long pieces of each color available; at least 2 samples of each color.
- D. Samples for Color Verification: 4 inch long pieces of each color available; at least 2 samples of each color.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section with at least three years of documented experience.

1.4 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a two year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealers that fail to achieve watertight seal or exhibit loss of adhesion or cohesion.

PART 2 PRODUCTS**2.1 PRECOMPRESSED FOAM SEALS**

- A. Precompressed Foam Seal: Urethane foam impregnated with water-repellent, with self-adhesive faces protected prior to installation by release paper.
 - 1. Color: Black.
 - 2. Size as required to provide weathertight seal when installed.
 - 3. Applications:
 - a. Secondary seal for interior and exterior expansion joints and opening perimeter joints.
 - 4. Manufacturers:
 - a. Emseal Joint Systems Ltd.; 25V: www.emseal.com.
 - b. Tremco Commercial Sealants & Waterproofing; ExoAir Eco: www.tremcosealants.com/#sle.
 - c. Willseal LLC; Willseal 600: www.willseal.com/#sle.

- B. Primary Precompressed Foam Seal: Pre-compressed, self-expanding foam joint sealant with a traffic grade silicone coating; foam impregnated with water-repellent, with self-adhesive faces protected prior to installation by release paper.
 - 1. Color: Custom color match to adjacent materials; change colors in same vertical line as adjacent materials change.
 - 2. Size as required to provide weathertight seal when installed.
 - 3. Applications:
 - a. Primary vertical exterior expansion joints.
 - 4. Manufacturers:
 - a. Emseal Joint Systems Ltd.; Colorseal: www.emseal.com.
 - b. MM Systems; EIV Series: www.mmsystemscorp.com.
 - c. Willseal LLC; Willseal 250: www.willseal.com/#sle.

2.2 ACCESSORIES

- A. Substrate Cleaner: Non-corrosive, non-staining type recommended by seal manufacturer; compatible with joint forming materials.
- B. Primer: Type recommended by seal manufacturer to suit application; non-staining.
 - 1. Installer must use primer for applications of precompressed foam systems regardless if the manufacturer may otherwise relieve the installer of primer use under conditions within acceptable parameters; installer will only be relieved of primer use when manufacturer documents the application to be non-compliant to tested assembly.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive this work.
- B. Measure joint dimensions and verify that seal products are of the correct size to properly seal the joints.

3.2 PREPARATION

- A. Properly prepare construction components adjacent to the work of this section to prevent damage and disfigurement due to this work.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's written instructions.
- B. Precompressed Foam Seals:
 - 1. Install only when ambient temperature is within recommended application temperature range of adhesive. Consult manufacturer when installing outside this temperature range.
 - 2. Prepare joints and install seals in accordance with manufacturer's written recommendations.
 - 3. Remove loose materials and foreign matter that could impair adhesion of sealant.
 - 4. Do not stretch precompressed seal; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.
 - 5. Produce seal continuity at ends, turns and intersections of joints.

3.4 CLEANING

- A. Clean adjacent soiled surfaces.

END OF SECTION

SECTION 07 92 00 - JOINT SEALANTS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.2 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer .
- B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants .
- C. ASTM C834 - Standard Specification for Latex Sealants .
- D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications .
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants .
- F. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems .
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants .
- H. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants .
- I. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants .
- J. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints .
- K. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness .
- L. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension .
- M. SCAQMD 1168 - Adhesive and Sealant Applications .
- N. SWRI (VAL) - SWR Institute Validated Products Directory .

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which laboratory adhesion and/or compatibility testing is required.
 - 6. Sample product warranty.
 - 7. Certification by manufacturer indicating that product complies with specification requirements.

8. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- F. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- G. Installation Plan: Submit at least four weeks prior to start of installation.
- H. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- I. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
- J. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
- K. Installation Log: Submit filled out log for each length or instance of sealant installed.
- L. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
 1. Manufacturer must designate a representative authorized to prepare a manufacturer's certificate, indicating compatibility of materials intended for each application.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- D. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
 1. Adhesion Testing: In accordance with ASTM C794.
 2. Compatibility Testing: In accordance with ASTM C1087.
 3. Stain Testing: In accordance with ASTM C1248??.
 4. Allow sufficient time for testing to avoid delaying the work.
 5. Deliver to manufacturer sufficient samples for testing.
 6. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
 7. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
- E. Installation Plan: Include schedule of sealed joints, including the following.
 1. Installation Log Form: Include the following data fields, with known information filled out.

- a. Substrates.
 - b. Sealant used.
 - c. Stated movement capability of sealant.
 - d. Size and actual backing material used.
 - e. Date of installation.
 - f. Name of installer.
 - g. Actual joint width; provide space to indicate maximum and minimum width.
 - h. Actual joint depth to face of backing material at centerline of joint.
 - i. Air temperature.
- F. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
1. Identification of testing agency.
 2. Name(s) of sealant manufacturers' field representatives who will be observing
 3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
 - a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.
 - b. Test date.
 - c. Sealant used.
 - d. Stated movement capability of sealant.
 - e. Test method used.
 - f. Date of installation of field sample to be tested.
 - g. Date of test.
 - h. Copy of test method documents.
 - i. Age of sealant upon date of testing.
 - j. Test results, modeled after the sample form in the test method document.
 - k. Indicate use of photographic record of test.
- G. Field Quality Control Plan:
1. Visual inspection of entire length of sealant joints.
 2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
 - a. For each different sealant and substrate combination, allow for one test every 12 inches in the first 10 linear feet of joint and one test every 24 inches thereafter.
 - b. If any failures occur in the first 10 linear feet, continue testing at 12 inch intervals at no extra cost to Owner.
 3. Field testing agency's qualifications.
 4. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.
- H. Field Adhesion Test Procedures:
1. Allow sealants to fully cure as recommended by manufacturer before testing.
 2. Have a copy of the test method document available during tests.
 3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
 - a. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.

4. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
5. Evaluation of Field Adhesion Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
 - a. Document cleaning and preparation procedures used for passing tests, to serve as standard practice for Project.
- I. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
 1. Record results on Field Quality Control Log.
 2. Repair failed portions of joints.
- J. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.
 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
 - b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.
 2. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- K. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period:
 - a. Silicone Sealants: Twenty years from date of Substantial Completion for vertical applications.
 - b. Silicone sealants for horizontal applications: Five years from date of substantial Completion.

- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 JOINT SEALANT APPLICATIONS

A. Scope:

1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 2. Interior Joints: Interior joints to be sealed include, but are not limited to, the following items:
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
 - 1) Exception: Such gaps and openings in ?gypsum board and _____? finished stud walls and suspended ceilings.
 - 2) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
 3. Do not seal the following types of joints.
 - a. Intentional weepholes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.
- B. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.2 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
1. Prohibit Methylene chloride and perchloroethylene in sealants.
- B. Installer must use primer for exterior assembly applications, including interior face of exterior wall joints, regardless if the manufacturer may otherwise relieve the installer of primer use under conditions within acceptable parameters; installer will only be relieved of primer use when manufacturer documents the application to be non-compliant to tested assembly.
- C. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

- D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range; allow custom colors for masonry joints.
- F. Minimum movement joint width 1/4-inch; minimum non-moving joint 1/8-inch.

2.3 NONSAG JOINT SEALANTS

- A. Use Type designations for identifying submittals and referencing in Installation Plan.
- B. Type A - Non-Staining Silicone Sealant: ASTM C920??, Grade NS; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: 50 percent movement in both extension and compression, minimum.
 - 2. Non-Staining To Porous Stone: When tested in accordance with ASTM C1248.
 - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 - 4. Manufacturers:
 - a. Dow Chemical Company; DOWSIL 795 Silicone Building Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - b. Pecora Corporation; 311 NS: www.pecora.com/#sle.
 - c. Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosealants.com/#sle.
 - d. Momentive Performance Materials; GE SCS 9000 Silpruf NB: www.siliconeforbuilding.com.
 - 5. Joint Locations:
 - a. Exterior joints in vertical surfaces and horizontal non-traffic surfaces.
 - 1) Construction joints in cast-in-place concrete.
 - 2) Joints between plant-precast architectural concrete units.
 - 3) Control and expansion joints in unit masonry.
 - 4) Openings below ledge angles in masonry.
 - 5) Joints between metal panels.
 - 6) Joints between different materials.
 - 7) Perimeter joints between materials listed above and frames of doors, frames and louvers.
 - 8) Control and expansion joints in soffits and other overhead surfaces.
 - b. Interior joints.
 - 1) Control and expansion joints on exposed interior surfaces of exterior walls.
 - 2) Perimeter joints of exterior openings where indicated.
- C. Type B - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
 - 1. Color: As selected by Architect from manufacturers full range.
 - 2. Manufacturers:
 - a. The Dow Chemical Company; DOWSIL 786 Mildew Resistant: consumer.dow.com/en-us/industry/ind-building-construction.html.
 - b. Momentive Performance Materials; GE SCS 1700: www.siliconeforbuilding.com.
 - c. Pecora Corporation; 898NST: www.pecora.com/#sle.
 - d. Sika Corporation; Sikasil GP: www.usa-sika.com/#sle.
 - e. Tremco Commercial Sealants & Waterproofing; Tremsil 200 Sanitary: www.tremcosealants.com/#sle.

3. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints.
 - c. Other joints as indicated.
- D. Type C - Hybrid Urethane Sealant: ASTM C920, Grade NS; single component; not expected to withstand continuous water immersion or traffic.
 1. Movement Capability: Plus and minus 35 percent, minimum.
 2. Hardness Range: 20 to 40, Shore A, when tested in accordance with ASTM C661.
 3. Color: Match adjacent finished surfaces.
 4. Manufacturers:
 - a. Sherwin-Williams Company; Stampede 1H Hybrid Sealant: www.sherwin-williams.com/#sle.
 - b. Tremco Commercial Sealants and Waterproofing; Dymonic FC: www.tremcosealants.com/#sle.
 - c. BASF; MasterSeal NP 100: www.master-builders-solutions.basf.us.
 5. Joint Locations: Contractor may use either this Type C hybrid sealant or Type A silicone, at locations indicated under Type A; remain consistent throughout the project.
- E. Type D - Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
 1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Hardness Range: 40 to 50, Shore A, when tested in accordance with ASTM C661.
 3. Color: To be selected by Architect from manufacturer's full range.
 4. Joint Locations: Interior joints in horizontal traffic surfaces.
- F. Type E - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
 1. Manufacturers:
 - a. Pecora Corporation; AC-20+: www.pecora.com/#sle.
 - b. Sherwin-Williams Company; Sherwin-Williams; S-W Sher-Max Ultra Acrylic Sealant: www.sherwin-williams.com/#sle.
 - c. Top Gun, a brand of PPG Architectural Coatings; Top Gun 200: www.ppgpaints.com/#sle.
 - d. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.
 - e. Bostik, Inc.; Chem-Calk 600.
 - f. BASF Building Systems; MasterSeal NP 520: www.master-builders-solutions.basf.us.
 - g. Momentive Performance Materials; RCS 20 Siliconized Acrylic Sealant: www.siliconeforbuilding.com.
 2. Joint Locations: Interior joints in vertical surfaces and horizontal non-traffic surfaces.
 - a. Vertical joints on exposed surfaces of interior unit masonry or concrete walls and partitions.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors, lites and elevator entrances.
 - c. Exposed joints in sound rated construction and exposed flanking sound paths, to be painted.
- G. Type - F - Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

1. Products:
 - a. Acoustical Solutions; OSI SC-175 Acoustical Caulk: www.acousticalsolutions.com.
 - b. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com/#sle.
 - c. Tremco Commercial Sealants & Waterproofing; Acoustical/Curtainwall Sealant: www.tremcosealants.com/#sle.
 - d. USG Sheet Rock Brand; Acoustical Sealant: www.usg.com.
2. Joint Locations: Covered or concealed joints in sound rated construction; covered or concealed flanking sound paths.

2.4 SELF-LEVELING SEALANTS

- A. Type G - Self-Leveling Polyurethane Sealant: ASTM C920, Grade P; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
 1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
 3. Manufacturers:
 - a. The QUIKRETE Companies; QUIKRETE® Polyurethane Self-Leveling Sealant: www.quikrete.com/#sle.
 - b. Sherwin-Williams Company; Loxon SL2 Self-Leveling Smooth Polyurethane Sealant: www.sherwin-williams.com/#sle.
 - c. BASF Building Systems; MasterSeal SL 2 or SL 100: www.master-builders-solutions.basf.us.
 - d. Tremco Commercial Sealants & Waterproofing; THC-901 or Vulkem 445SSL.
 4. Joint Locations: Exterior joints in horizontal traffic surfaces.
- B. Type H - Self-Leveling Polyurethane Sealant for Horizontal Expansion Joints: ASTM C920, Grade P, Uses T, M and O; multi-component; explicitly approved by manufacturer for horizontal expansion joints.
 1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Hardness Range: 30 to 35, Shore A, when tested in accordance with ASTM C661.
 3. Tensile Strength: 200 to 250 psi in accordance with ASTM D412.
 4. Manufacturers:
 - a. Tremco Commercial Sealants & Waterproofing; THC-901 or Vulkem 445SSL: www.tremcosealants.com/#sle.
 - b. BASF Building Systems; MasterSeal SL 2: www.master-builders-solutions.basf.us.
 - c. Sherwin-Williams; S-W Loxon SL2 Self-Leveling Smooth Polyurethane Sealant: www.sherwin-williams.com/#sle.
- C. Type I - Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
 1. Composition: Multi-component, 100 percent solids by weight.
 2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
 3. Color: Concrete gray.
 4. Joint Width, Minimum: 1/8 inch.
 5. Joint Width, Maximum: 1/4 inch.
 6. Joint Depth: Provide product suitable for joints from 1/8 inch to 2 inches in depth including space for backer rod.
 7. Manufacturers:

- a. Dayton Superior Corporation; Pro-Poxy P606: www.daytonsuperior.com/#sle.
 - b. Euclid Chemical Company; EUCO 700: www.euclidchemical.com/#sle.
 - c. Nox-Crete; DynaFlex 502: www.nox-crete.com/#sle.
 - d. W.R. Meadows, Inc; Rezi-Weld Flex: www.wrmeadows.com/#sle.
 - e. BASF Building Systems; MasterSeal CR 190: www.master-builders-solutions.basf.us.
- D. Type J - Semi-Rigid Self-Leveling Polyurea Joint Filler: Two-component, 100 percent solids; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
1. Durometer Hardness, Type A: 75, minimum, after seven days when tested in accordance with ASTM D2240.
 2. Color: Concrete gray.
 3. Joint Width, Minimum: 1/8 inch.
 4. Joint Width, Maximum: 3/4 inch.
 5. Joint Depth: Provide product suitable for joints from 1/8 inch to 1 inch in depth excluding space for backer rod.
 6. Manufacturers:
 - a. Adhesives Technology Corporation; Crackbond JF-311: www.atcepoxy.com/#sle.
 - b. ARDEX Engineered Cements; ARDEX ARDISEAL RAPID PLUS: www.ardexamericas.com/#sle.
 - c. Euclid Chemical Company; EUCO QWIKjoint UVR: www.euclidchemical.com/#sle.
 - d. Nox-Crete; DynaFlex JF-85: www.nox-crete.com/#sle.
 - e. SpecChem, LLC; Rapid Flex CJ: www.specchemllc.com/#sle.
 - f. BASF Building Systems; MasterSeal CR 100: www.master-builders-solutions.basf.us.

2.5 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Secondary Joint Backing: Precompressed foam seals; refer to Division 9 Section, 07 91 00 - Preformed Joint Seals.
- D. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- E. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.

- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
 - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
 - 2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.
 - 3. Arrange for sealant manufacturer's technical representative to be present during tests.
 - 4. Record each test on Preinstallation Adhesion Test Log as indicated.
 - 5. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
 - 6. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
 - 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 porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Refer to preparation procedures documented by preconstruction testing, in producing acceptable results.

3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.

- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- I. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 07 95 13 - EXPANSION JOINT COVER ASSEMBLIES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Expansion joint cover assemblies for floor, wall, and ceiling surfaces.

1.2 RELATED REQUIREMENTS

- A. Section 03 10 00 - Concrete Forming and Accessories: Placement of joint cover assembly frames in formwork.

1.3 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2010.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- C. Product Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
 - 1. Manufacturer and model number for each expansion control system.
 - 2. Expansion control system location cross-referenced to Drawings.
 - 3. Nominal joint width.
 - 4. Movement capability.
 - 5. Classification as thermal or seismic.
 - 6. Materials, colors, and finishes.
 - 7. Product options.
 - 8. Fire-resistance ratings.
- D. Product Test Reports: For each fire barrier provided as part of an expansion control system, for tests performed by a qualified testing agency.
- E. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, effected adjacent construction and anchorage locations.
- F. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content column covers: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
- G. Samples: Submit two samples minimum 12 inch long, illustrating profile, dimension, color, and finish selected.
- H. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: Where indicated, provide expansion control systems with fire barriers identical to those of systems tested for fire resistance per UL 2079 or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Hose Stream Test: Wall-to-wall and wall-to-ceiling systems shall be subjected to hose stream testing.
- B. Seismic Performance: Expansion control systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
 - 2. Component Importance Factor is 1.5.
- C. Source Limitations: Obtain expansion control systems from single source from single manufacturer.

2.2 MANUFACTURERS

- A. Architectural Art Mfg. Company.
 - 1. Floor-to-Floor Joint Systems: A Series, serrated type.
 - 2. Floor-to-Wall Joint Systems: A Series, serrated type.
 - 3. Wall-to-Wall Joint Systems: G Series, snap on type.
 - 4. Wall-to-Ceiling Joint Systems: C Series.
 - 5. Ceiling-to-Ceiling Joint Systems: C Series.
- B. Balco, Inc.
 - 1. Floor-to-Floor Joint Systems: 6000 Series, serrated type.
 - 2. Floor-to-Wall Joint Systems: 6000 Series, serrated type.
 - 3. Wall-to-Wall Joint Systems: WD/WDC Series.
 - 4. Wall-to-Ceiling Joint Systems: 7500 Series.
 - 5. Ceiling-to-Ceiling Joint Systems: 7500 Series.
- C. Construction Specialties, Inc: www.c-sgroup.com.
 - 1. Floor-to-Floor Joint Systems: ALS Series.
 - 2. Floor-to-Wall Joint Systems: ALSW Series.
 - 3. Wall-to-Wall Joint Systems: ASM Series.
 - 4. Wall-to-Ceiling Joint Systems: Thinline Series; Type FCFC.
 - 5. Ceiling-to-Ceiling Joint Systems: Thinline Series; Type FCF.
- D. MM Systems Corp.:
 - 1. Floor-to-Floor Joint Systems: Classic Cover Systems; type HFX.
 - 2. Floor-to-Wall Joint Systems: Classic Cover Systems; type HFXE.
 - 3. Wall-to-Wall Joint Systems: Model EX-K for flat and Model EX-L for corner.
 - 4. Wall-to-Ceiling Joint Systems: Flexible Wall and Ceiling Series VSWL and VSGL.
 - 5. Ceiling-to-Ceiling Joint Systems: Flexible Wall and Ceiling Series VSG.

2.3 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
 - 1. Joint Dimensions and Configurations: As indicated on drawings.

2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Fire-Resistance Rating: Provide expansion control system and fire-barrier assembly with a rating not less than that of adjacent construction.

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
1. Exposed Finish Outdoors: Natural anodized.
 2. Exposed Finish at Floors: Mill finish or natural anodized.
 3. Exposed Finish at Walls and Ceilings: Natural anodized.
- B. Resilient Seals:
1. For Ceilings: Any resilient material, flush, pleated, or hollow gasket.
 2. Color: To be selected from manufacturers full line.
- C. Anchors and Fasteners: As recommended by cover manufacturer.
- D. Ferrous Metal Anchors: Galvanized where embedded in concrete or in contact with cementitious materials.
- E. Resilient Filler: Neoprene, exhibiting Shore A hardness of 40 to 50 Durometer.
- F. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.
- G. Elastomeric Concrete: Modified epoxy or polyurethane extended into a prepackaged aggregate blend, specifically designed for bonding to concrete substrates.
- H. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required fire-resistance rating.
- I. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
- J. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.5 FABRICATION

- A. Joint Covers: Aluminum cover plate, aluminum frame construction, retainers with resilient elastomeric filler strip, designed to permit plus or minus 50 percent joint movement with full recovery, flush mounted.
- B. Back paint components in contact with cementitious materials.
- C. Shop assemble components and package with anchors and fittings.
- D. Provide joint components in single length wherever practical. Minimize site splicing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

3.2 PREPARATION

- A. Provide anchoring devices for installation and embedding under Section 03 10 00.
 - 1. Provide templates and rough-in measurements.

3.3 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level.
- C. Rigidly anchor to substrate to prevent misalignment.
- D. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion control system materials and associated work so complete assemblies comply with assembly performance requirements.
 - 1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

3.4 PROTECTION

- A. Do not permit traffic over unprotected floor joint surfaces.

END OF SECTION

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Hollow metal borrowed lites glazing frames.

1.2 RELATED REQUIREMENTS

- A. Section 08 71 00 - Door Hardware.
- B. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.

1.3 REFERENCE STANDARDS

- A. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- F. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2017.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- I. ITS (DIR) - Directory of Listed Products; current edition.
- J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- L. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- M. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2018.
- N. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- O. UL (DIR) - Online Certifications Directory; Current Edition.
- P. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
 - 1. Submit door and frame schedule using reference designations indicated on Drawings. Include opening size(s), handing of doors, details of each frame type, elevations of door design types, location, hardware set numbers, details of splice connections, fire label requirements, temperature rise requirements, hardware mounting locations, glass moldings, welding details, internal reinforcing and anchor details.
 - 2. As part of the shop drawing submittal, provide copies of the following:
 - a. ANSI/A250.11-2012 - Recommended Erection Instructions for Steel Frames
 - b. HMMA-840, TN01-07 - Painting Hollow Metal Products
 - c. HMMA-810, TN01-03 - Defining Undercuts
- D. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For steel doors: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content steel or aluminum: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
- E. Manufacturer's Qualification Statement.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Supplier Qualifications:
 - 1. Supplier must maintain at the location which will be managing the project, a credentialed Architectural Hardware Consultant (AHC) or Certified Door Consultant (CDC) as a full time employee, and member in good standing of DHI - Door Security + Safety Professionals.
 - 2. Architectural Hardware Consultant (AHC) or Certified Door Consultant (CDC) to supervise other individuals employed by the supplier who work on the project and be available throughout the Project to meet with the Contractor, Architect or Owner as needed.
 - 3. Supplier must be experienced and have completed projects with material, design and scope similar to that specified for this project. If requested by the Owner or Architect, submit a list of projects completed in the last five years with the project name, location, owner, architect and contractor.
 - 4. Supplier must maintain an office and warehouse complete with a hollow metal inventory within a 100 mile radius of the jobsite. Supplier to further have a qualified field service staff available to service the Project.
- C. Maintain at project site copies of reference standards relating to installation of products specified.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store doors vertically in a dry area, under proper cover. Place the units on 4" high wood sills on floors in a manner that will prevent rust and damage. Avoid storage in non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting. If the door becomes wet, or moisture appears, remove protective wrapping immediately. Provide a 4" space between the doors to permit air circulation. Proper storage is required to meet the requirements of ANSI/SDI A250.10 and HMMA 840.
- B. Storage of Frames:
 - 1. Store frames in an upright position with heads uppermost under cover on 4" wood sills on floors in a manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting. Store assembled frames in a vertical position, five units maximum in a stack. Provide a 2" space between frames to permit air circulation.
 - 2. Store all hollow metal products in a manner to prevent exposure to adverse environmental elements and maintain the requirements of ANSI/SDI A250.10 and HMMA 840.
 - 3. Sand, touch up and clean prime painted surfaces prior to finish painting in accordance with the manufacturer's instructions. Zinc base primer is to be used at all galvanized doors and frames.

1.7 COORDINATION

- A. Coordinate Work with other sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware and electrified items.
- B. Coordinate hardware mounting heights as specified under Section 087100.
- C. Coordinate door undercuts with architect's details and specified hardware under Section 087100. Interior doors to be 3/8" undercut unless otherwise indicated.
- D. Factory prep hollow metal frames to receive door contacts. Refer to security drawings for details, diagrams and locations.
- E. The Contractor shall field verify existing door opening conditions where existing doors or frames are to remain or be replaced in part, for coordination with the specified hardware and notify the Architect of conflicts prior to proceeding. Failure to notify the Architect of conflicts that result in additional work or material is the responsibility of the Contractor, with no cost to the Owner.
- F. Field dimensions need to be verified and approved prior to fabrication.
- G. The supplier shall be responsible for proper coordination, templating, dimensions and all details required for doors, frames and hardware application.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
- B. Mesker, dormakaba Group: www.meskeropeningsgroup.com.
- C. Metal Products, Inc.: www.metalproductsinc.com.
- D. Republic Doors, an Allegion brand: www.republicdoor.com.
- E. De La Fontaine Inc: www.delafontaine.com.
- F. Steelcraft: www.steelcraft.com.
- G. Pioneer Industries, an Assa Abloy company; www.pioneerindustries.com.

2.2 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 2. Recycled Content: Provide steel and aluminum with minimum 25 percent post-consumer recycled content.
 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
 4. Door Edge Profile: Manufacturers standard for application indicated.
 5. Typical Door Face Sheets: Flush.
 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
 8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 9. Finish: Factory primed, for field finishing.
- B. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.
1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with NFRC 102 and/or ASTM C1363 and meet or exceed the following requirements:
 - a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.374, R-Value 2.53, including insulated door and thermal-break frame.
 2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with NFRC 400 and/or ASTM E283 to meet or exceed the following requirements:
 - a. Rate of leakage of the door assembly shall not exceed 0.1 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).
 3. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound- or thermally-rated must comply with the requirements specified for exterior doors and for sound- or thermally-rated doors; where two requirements conflict, comply with the most stringent.

2.3 HOLLOW METAL DOORS

- A. Exterior Doors: Thermally insulated.
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.

- d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
 2. Door Core Material: Polyurethane.
 - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
 3. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
 4. Weatherstripping: Refer to Section 08 71 00.
 5. Close to and bottom edges with galvanized, inverted steel channels; seal joints in top edges of doors against water penetration.
- B. Interior Doors, Non-Fire-Rated:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
 2. Door Thickness: 1-3/4 inch, nominal.
- C. Fire-Rated Doors:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 - a. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
 - b. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - c. Attach fire rating label to each fire rated unit.

2.4 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. General:
1. Comply with the requirements of grade specified for corresponding door, except:
 - a. ANSI/SDI A250.8 (SDI-100), Level 2 and 3 Door Frames: 14 gage, 0.067 inch, minimum thickness.
 - b. Frames for Wood Doors: Comply with frame requirements in accordance with ANSI/SDI A250.8 (SDI-100), Level 4, 14 gage, 0.067 inch, minimum thickness.
 - c. Frames for Sound-Rated Wood Doors: Comply with frame requirements in accordance with ANSI/SDI A250.8 (SDI-100), Level 4, 14 gage, 0.067 inch, minimum thickness.
 2. Finish: Same as for door.
 3. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
- C. Thermal Break Exterior Door Frames: Kerf type.

1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
 2. Thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400.
 3. Fabricate with 1/16-inch positive thermal break and integral vinyl weatherstripping, matching tested assembly.
 4. Fabricate with mitered corners; profile as indicated on drawings.
 5. Frames: Minimum 12 gauge (0.081-inch -2.7-mm) thick steel sheet.
 6. Products:
 - a. Assa Abloy brands; Mercury Thermal Break TQB Series.
 - b. De La Fontaine; Thermal Break Profile.
 - c. Fleming Door Products; TB Series Frames.
 - d. Pioneer; Thermal Break Frames.
 - e. Equivalent product of other named manufacturers.
- D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
- E. Door Frames, Fire-Rated: Full profile/continuously welded type.
1. Fire Rating: Same as door, labeled.
- F. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- G. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.
- H. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
- I. Mullions and Transom Bars: Join to adjacent members by welding.
- ## 2.5 FINISHES
- A. Factory Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, compliant and compatible with Division 9 painting specifications.
- B. Field-applied Coating: High-build, water-resistant, resilient coating; VOC-compliant.
- ## 2.6 FRAME ANCHORS
- A. Jamb Anchors:
1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.
- ## 2.7 ACCESSORIES
- A. Glazing: As specified in Section 08 80 00, factory installed.
- B. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

- C. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.
- D. Ceiling Struts: Minimum 1/4 inch thick by 1 inch wide steel.

2.8 FINISH MATERIALS

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

2.9 INSECT SCREEN FOR KITCHEN DOOR

- A. Provide insect screens as indicated. Design door framing and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches.
- B. Screen Frames: Fabricate frames of tubular-shaped, extruded- or formed-aluminum members of 0.050-inch-minimum wall thickness, with mitered or coped joints and concealed mechanical fasteners. Finish frames to match door. Provide removable PVC spline-anchor concealing edge of screen frame.
- C. Stainless Steel Wire Fabric: 18-by-16 mesh of 0.011 inch diameter, non-magnetic stainless steel wire, Type 304 or 316 complying with FS RR-W-365, Type VI.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

- A. Coat inside of frames with high-build, water-resistant, resilient coating coating to a thickness of 1/16 inch.

3.3 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Install door silencers in frames.
- E. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
- F. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
- G. Install door hardware as specified in Section 08 71 00.
- H. Coordinate installation of glazing; install frames with removable glazing stops located on secure side of opening.
- I. Coordinate installation of electrical connections to electrical hardware items.
- J. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

- K. Touch up damaged factory finishes.
- L. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jamb and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors according to NFPA 105.

3.4 TOLERANCES

- A. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
- B. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
- C. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
- D. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

3.5 ADJUSTING

- A. Adjust for smooth and balanced door movement.
- B. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

3.6 FIELD QUALITY CONTROL

- A. Fire Door Assembly Inspection and Testing: Upon completion of the installation, provide functional testing and inspection of each fire door assembly on the project to confirm proper operation and that it meets all criteria of a fire door assembly as per NFPA 80, 5.2 - Inspection and Testing.
 - 1. Inspections must be performed by individuals with knowledge and understanding of the operating components of the door being subjected to testing and who are certified by Intertek as a Fire Door Assembly Inspector (FDAI) or a credentialed Architectural Hardware Consultant (AHC).
 - 2. Inspectors must prepare written report using forms provided by the Door and Hardware Institute shall be maintained and transmitted to the Owner, Architect, Contractor and made available to the Authority Having Jurisdiction (AHJ); report must list each fire door throughout the project, and include door number, location, hardware set used and summary of deficiencies.
- B. Coordinate inspection with the Contractor and Owner; timing of inspections must anticipate for correction and re-inspection. Owner's occupation of project or portions of the project cannot be delayed by these inspections.

- C. Contractor shall correct all deficiencies and schedule a re-inspection of fire door assemblies which were noted as deficient on the inspection report. All deficiencies must be repaired without delay.
- D. Inspector shall re-inspect fire door assemblies after repairs are made.
- E. Additional re-inspections which are required due to incomplete repairs will be performed by the inspector, at the expense of the Contractor.

3.7 PROTECTION

- A. Provide protective measures required throughout the construction period to ensure that door and frame units will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION

SECTION 08 14 16 - FLUSH WOOD DOORS**PART 1 GENERAL****1.1 SECTION INCLUDES**

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

1.2 RELATED REQUIREMENTS

- A. Section 08 80 00 - Glazing.

1.3 REFERENCE STANDARDS

- A. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- B. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- C. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- E. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Specimen warranty.
- D. Test Reports: Show compliance with specified requirements for the following:
 - 1. Sound-retardant doors and frames; sealed panel tests are not acceptable.
- E. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing and louvers.
 - 1. Shop Drawings: Submit door and frame schedule using reference designations indicated on Drawings. Include opening size(s), handing of doors, details of each frame type, elevations of door design types, location, hardware group numbers, fire label requirements, including fire rating time duration, maximum temperature rise requirements, hardware mounting locations, glass beads/moldings, glass kits, internal blocking, vertical edge details, top and bottom rail details, undercuts, beveling and other pertinent data.
 - 2. As part of the Shop Drawing submittal, provide copy of WDMA J1, Job Site Information, "How to store, handle, finish, install and maintain wood doors."
 - 3. Provide door construction details/drawings of vertical edges, top rail and SWE details for all doors.
 - 4. Indicate location of cutouts for hardware and blocking to ensure doors are properly prepared and coordinated to receive hardware.
- F. Samples: Submit two samples of door veneer, 12 x 12 inch in size illustrating wood grain, stain color, and sheen.
- G. LEED Submittals: Comply with Section 018113.

1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For wood doors, if applicable: Product-specific declaration or Industry-wide EPD or product-specific EPD.
2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For wood doors having recycled content: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For certified wood doors: Documentation indicating percentage new wood, percentage FSC and Chain-of-Custody (CoC) certificates indicating compliance with forest certification requirements. Include vendor invoice indicating FSC CoC.
3. MR Credit 4: BPDO - Material Ingredients
 - a. For wood doors, if applicable: Material Ingredient Report.
4. EQ Credit 2: Low-Emitting Materials
 - a. For composite wood doors: Documentation indicating compliance with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

H. Warranty, executed in Owner's name.

1.5 QUALITY ASSURANCE

- A. Forest Certification: Provide wood products made from forests certified by an FSC-accredited certification body. All non-FSC wood in assemblies with FSC-certified wood shall meet the FSC Controlled Wood (CW) criteria.
- B. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated.
 1. Provide metal labels permanently affixed to each fire door at an authorized and licensed facility as evidence of compliance with procedures of the labeling agency.
 2. No field modifications can be made to the fire door assembly that would void the label. Field modifications to a fire door must be in accordance with NFPA80. Work must be done by a licensed labeling service approved by the manufacturer.
 3. Labels are not to be removed, defaced or made illegible while the door is in service per NFPA 80. Fire labels are not to be painted or pre-finished.
 4. Fire doors with continuous hinges to have the physical label located on the top rail of the door.
- C. Supplier Qualifications:
 1. Supplier must maintain at the location which will be managing the project, a credentialed Architectural Hardware Consultant (AHC) or Certified Door Consultant (CDC) as a full time employee and member in good standing of DHI - Door Security + Safety Professionals.
 2. The Architectural Hardware Consultant (AHC) or Certified Door Consultant (CDC) shall supervise other individuals employed by the Wood Door Supplier who work on the project and be available throughout the project to meet with the Contractor, Architect or Owner as needed.
 3. Supplier must be experienced and have completed projects with material, design and scope similar to that specified for this project. If requested by the Owner or Architect, submit a list of projects completed in the last five (5) years with the project name, location, Owner, Architect and Contractor.
 4. Supplier must maintain an office and warehouse complete with a wood door inventory within a 100 mile radius of the jobsite. Supplier must have a qualified field service staff available to service the Project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Provide protective measures throughout the construction period to safeguard doors from damage or deterioration from the time of acceptance.
- D. Store and protect doors in accordance with manufacturer's recommendations and Section J-1 of WDMA I.S. 1A-13 - "How to Store, Handle, Finish, Install and Maintain Wood Doors"
 - 1. Store doors flat and off the floor on a level surface in a dry, well-ventilated building. Do not store on edge. Protect doors from dirt, water and abuse and allow for air circulation.
 - 2. Protect all doors from exposure to direct sunlight and artificial light after delivery.
 - 3. Do not subject interior doors to extremes of either heat or humidity. HVAC systems must be operational and balanced, providing a temperature range of 50 to 80 degrees Fahrenheit and 30% to 60% relative humidity.
 - 4. When handling doors, lift and carry when moving. Do not drag across other doors or surfaces. Handle with clean, dry hands or while wearing clean dry gloves.
- E. Manufacturer shall mark each door on the top rail and top hinge pocket with the door opening number. In addition, mark the top rail with manufacture's name, factory order number, and other additional markings to properly identify the door.

1.7 PROJECT CONDITIONS

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Eggers Industries/VT Industries: www.eggersindustries.com.
- B. Lambton Doors: www.lambtondoors.com.
- C. Masonite Architectural Aspiro Series; Marshfield-Algoma legacy brand: <https://architectural.masonite.com/products/aspiro-series>.
- D. Oshkosh Architectural Door Company: www.oshkoshdoor.com.

2.2 DOORS

- A. Doors: Refer to drawings for locations and additional requirements.
 - 1. Quality Level: Custom Grade, in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1300.
 - a. Grade A faces.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
 - 3. Recycled Content: Provide composite wood door cores with minimum 80 percent recycled content.

4. Composite wood doors: Comply with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
1. Provide solid core doors at each location.
 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
 - a. Validate the Smoke and Draft Control ("S") Label for hardware sets that include Category H smoke and draft control seals.
 3. Sound-Rated Doors: Minimum STC of 42 or better, calculated in accordance with ASTM E413, tested in accordance with ASTM E90.
 - a. Provide doors specifically designed for sound transmission control with a high density core and damping.
 - b. Refer to hardware specification for required hardware items.
 4. Wood veneer facing for field transparent finish as indicated on drawings.

2.3 DOOR AND PANEL CORES

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

2.4 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: White Maple, veneer grade in accordance with quality standard indicated, quarter cut, with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face; unless otherwise indicated.
 1. Vertical Edges: Any option allowed by quality standard for grade.
 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
 3. Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 20 feet or more.

2.5 ACCESSORIES

- A. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

2.6 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with Bonded Stiles and Rails:
 1. Provide solid blocks at lock edge for hardware reinforcement.
 2. Provide solid blocking for other throughbolted hardware.
- C. Fit door edge trim to edge of stiles after applying veneer facing.
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

- E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- F. Provide edge clearances in accordance with the quality standard specified.

2.7 FACTORY FINISHING - WOOD VENEER DOORS

- A. Factory finish doors in accordance with specified quality standard:
 - 1. Transparent Finish: Transparent catalyzed polyurethane, Premium quality, TR-6, satin sheen.
 - 2. Staining: As selected by Architect from manufacturer's full range.
 - 3. Effect: Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores.
 - 4. Sheen: Satin.
 - 5. Finish and seal faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on edges of cutouts, and mortises.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- 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.

3.2 TOLERANCES

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

3.3 ADJUSTING

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

3.4 FIELD QUALITY CONTROL

- A. Fire Door Assembly Inspection and Testing: Upon completion of the installation, provide functional testing and inspection of each fire door assembly on the project to confirm proper operation and that it meets all criteria of a fire door assembly as per NFPA 80, 5.2 - Inspection and Testing.
 - 1. Inspections must be performed by individuals with knowledge and understanding of the operating components of the door being subjected to testing and who are certified by Intertek as a Fire Door Assembly Inspector (FDAI) or a credentialed Architectural Hardware Consultant (AHC).
 - 2. Inspectors must prepare written report using forms provided by the Door and Hardware Institute shall be maintained and transmitted to the Owner, Architect, Contractor and made available to the Authority Having Jurisdiction (AHJ); report must list each fire door throughout the project, and include door number, location, hardware set used and summary of deficiencies.

- B. Coordinate inspection with the Contractor and Owner; timing of inspections must anticipate for correction and re-inspection. Owner's occupation of project or portions of the project cannot be delayed by these inspections.
- C. Contractor shall correct all deficiencies and schedule a re-inspection of fire door assemblies which were noted as deficient on the inspection report. All deficiencies must be repaired without delay.
- D. Inspector shall re-inspect fire door assemblies after repairs are made.
- E. Additional re-inspections which are required due to incomplete repairs will be performed by the inspector, at the expense of the Contractor.

3.5 PROTECTION

- A. Provide protective measures required throughout the construction period to ensure that doors will be without damage or deterioration at time of acceptance.

END OF SECTION

SECTION 08 31 00 - ACCESS DOORS AND PANELS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Access door and frame units, fire-rated, in wall locations.

1.2 REFERENCE STANDARDS

- A. ITS (DIR) - Directory of Listed Products; current edition.
- B. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Babcock-Davis.
 - 1. Non-Rated: Cierra BNT Series.
 - 2. Rated: Cierra BIT Series.
- B. Karp Associates, Inc.
 - 1. Non-Rated: DSC-214M Series.
 - 2. Rated: KRP Series.
- C. Milcor Inc.:
 - 1. Non-Rated: Style M or DW.
 - 2. Rated: Style UFR or NIFR.
- D. Nystrom, Inc.
 - 1. Non-Rated: NT Series.
 - 2. Rated: Cierra I Series.
- E. Williams Bros. Corporation of America:
 - 1. Non-Rated: WB-GP or WB-DW Series.
 - 2. Rated: WB-FR Premium or WB-FR Standard with Drywall Bead.

2.2 ACCESS DOORS AND PANELS

- A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.
- B. Units in Fire Rated Assemblies: Fire rating equivalent to the fire rated assembly in which they are to be installed.
 - 1. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.

2.3 ACCESS DOOR UNITS - WALLS AND CEILINGS

- A. Door and Frame Units: Formed steel.

1. Door: Minimum 16 gage thick sheet metal, set flush with exposed face flange of frame.
 2. Frame: Minimum 16 gage thick sheet metal with 1 inch wide, surface-mounted trim.
 3. Hinges: Concealed pivot rod.
 4. Lock: Provide door panel with cylinder keyed to building Best Lock masterkey program.
 5. Steel Finish: Factory primed for field painting.
- B. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Formed steel.
1. Fire-Resistance Rating: Not less than that of adjacent construction.
 2. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
 3. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 20 gage.
 4. Frame: Minimum 16 gage thick sheet metal with 1-inch wide, surface-mounted trim.
 5. Hinges: Concealed-pin type.
 6. Automatic Closer: Spring type.
 7. Lock: Self-latching device with cylinder keyed to building Best Lock masterkey program.
 8. Steel Finish: Factory primed for field painting.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 32 23 - SLIDING AND FOLDING GLAZED WALLS AND DOORS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Factory fabricated sliding/folding glazed door/wall with frames and operating hardware.
 - 1. Aluminum panel frame system.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide information on dimensions, frame and sill construction, glazing, and hardware.
- C. Shop Drawings: Indicate opening dimensions, elevations of different types, and framed opening tolerances.
- D. Samples: Submit two samples, 12 by 12 inch in size illustrating typical frame corner construction, accessories, and finishes.
- E. Submit one sample of door hardware.
- F. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in, and with not fewer than 25 years of experience, manufacturing products of the type specified.
- B. Installer Qualifications: Company specializing in installation of products of the type specified, with not fewer than three years of experience.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site and store in manufacturer's protective cartons until openings are ready for installation.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.5 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.
- B. Provide ten year manufacturer warranty against failure of rollers or glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Aluminum Panel Frame Sliding/Folding Glazed Doors/Walls:
 - 1. C.R. Laurence Co., Inc.; Monterey Bi-Folding Door and Wall System:
www.crlaurence.com.
 - 2. Basis-of-Design: NANA Wall Systems, Inc.; Model AcoustiFOLD (Basis-of-Design):
www.nanawall.com.

2.2 PERFORMANCE REQUIREMENTS

- A. Acoustical Performance: Provide glass partitions and door assemblies tested by qualified testing agency, calculated in accordance with ASTM E413, tested in accordance with ASTM E90, and rated for not less than Sound Transmission Class (STC) indicated.
1. System STC (Rw) 45 (45) with frame recessed and 1-9/16 inch (40 mm) double IGU, air filled, 10 mm + 8 mm STC 48 laminated glass.

2.3 SLIDING/FOLDING GLAZED DOORS/WALLS

- A. Aluminum Sliding/Folding Glazed Doors/Walls: Extruded aluminum sliding/folding and operable panel frames, factory fabricated; complete with sill/threshold, flashings, support and anchorage devices, and glazing.
1. Support: Sliding and folding hardware with top and bottom tracks; floor track supported with upper guide track.
 2. Panel Rail Depth: 2-1/4 inch minimum.
 3. Aluminum Members: Factory finished; bracketed corner construction.
 4. Glass Stops: Same material and color as frame.
 5. Aluminum Frame Finish: Powder coating in accordance with AAMA 2604.
 6. Fixed Door: Provide an entry panel with swing panel.

2.4 FACTORY ASSEMBLY

- A. Factory assemble sliding/folding operable panel frames as single unit, including head, jambs, and bottom sections; provide concealed fasteners.
1. Sizes: Allow for tolerances of rough framed openings, clearances, and shims at perimeter of assemblies.
 2. Joints and Corners: Flush, hairline and waterproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 3. Joints and Connections: Flush, hairline width, and waterproof; accurately and rigidly joined corners.

2.5 COMPONENTS

- A. Locking Hardware and Handles:
1. Main entry panel:
 - a. On the main entry panel provide manufacturer's standard lever handles on the inside and outside, a building keying system compatible lock set with lockable latch, multi-point locking with a dead bolt and rods at the top and bottom on primary panel only. Rods to be concealed and not edge mounted. After turn of key or thumbturn, depression of handles withdraws latch. Lifting of handles engages rods and turn of key or thumb turn engages deadbolt and operates lock. At secondary swing panel, provide two point locking with flat handles on inside only for the secondary swing panel.
 - b. Stainless steel lever handles.
 2. On all other secondary swing panels and pairs of folding panels, provide manufacturer's standard flat handles and concealed two point locking hardware operated by 180 degree turn of handle between each pair. Face applied flush bolt locking will not be allowed (except for units with paired handles).
 3. Flat handle finish:
 - a. Stainless steel.
 4. Provide handle height centered at 41 3/8" from bottom of panel.

5. Aluminum locking rods with fiber glass reinforced polyamide end caps at top and bottom. Rods to have a stroke of 15/16" (24 mm).
- B. Sliding/Folding Hardware: Provide manufacturer's standard combination sliding and folding hardware with top and bottom tracks.
 1. For each pair of folding panels, provide cardanic, independently suspended, four wheeled coated with fiber glass reinforced polyamide upper running carriage and lower guide carriage.
 2. Provide manufacturer's standard zinc die cast powder coated hinges that are closest to match to finish of frame and panels. Provide stainless steel security hinge pins with set screws.
 3. Adjustment: Provide system capable of specified amount of adjustments without removing panels from tracks without needing to remove panels from tracks, 1/16" (1.5 mm) in width per hinge.
- C. Other Components:
 1. Provide stainless steel screws for connecting frame components.
 2. Sound Gasketing: Manufacturer's double layer EPDM between panels and EPDM gasket, Q-Ion gasket, or brush seal between panel and frame, or brush seals with a two-layer fiberglass reinforced polyamide fin attached at both inner and outer edge of bottom of door panels with a recessed sill or on frame for sealing between panels and between panel and frame.
- D. Cylinder Locks: Manufacturer's standard.
- E. Anchors: Hot-dipped galvanized or stainless steel in accordance with project and manufacturer's installation requirements.
- F. Sealant and Backing Materials: As specified in Section 07 92 00.

2.6 FABRICATION

- A. Use extruded aluminum frame and panel profiles, corner connectors and hinges, sliding and folding hardware, lock- ing hardware and handles, glass and glazing and weather stripping as specified herein to make a folding glass wall.
- B. Factory pre-assemble and ship with all components and installation instructions.
- C. Sizes and Configurations: See drawings for selected custom dimensions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that openings are ready to receive work and opening dimensions and clearances are as indicated on approved shop drawings.

3.2 INSTALLATION

- A. Install door/wall unit assembly in accordance with manufacturer's instructions.
- B. Attach frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Use anchorage devices to securely fasten assembly to adjacent construction without distortion or imposed stresses.
- D. Install perimeter trim and interior closures.

3.3 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.

- B. Maximum Variation from Plumb: 1/16 inch.
- C. Maximum Variation from Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 feet straight edge.

3.4 ADJUSTING

- A. Adjust hardware for smooth operation.

3.5 CLEANING

- A. Remove protective material from factory finished surfaces.
- B. Remove labels and visible markings.
- C. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

3.6 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 33 13 - COILING COUNTER DOORS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Non-fire-rated coiling counter doors and operating hardware.

1.2 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish.
- C. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.
- D. Samples: Submit two slats, 4 inch long, illustrating shape, color and finish texture.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For doors having recycled content: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
- F. Operation and Maintenance Data: Indicate modes of operation, lubrication requirements and frequency, and periodic adjustments required.

1.4 WARRANTY

- A. Warranty Period: Two years for defects in material and workmanship.

PART 2 PRODUCTS**2.1 COILING COUNTER DOORS**

- A. Coiling Counter Doors, Non-Fire-Rated: Stainless steel and steel slat curtain as noted.
 - 1. Mounting: Between jambs, within prepared opening.
 - 2. Provide integral frame and sill of same material and finish.
 - 3. Nominal Slat Size: 1-1/4 inches wide.
 - 4. Slat Profile: Flat.
 - 5. Finish: No. 4 Stainless Steel at Cafeteria.
 - 6. Color: As selected by Architect from manufacturer's standard range.
 - 7. Guides: Formed track; same material and finish unless otherwise indicated.
 - 8. Hood Enclosure: Manufacturer's standard; primed steel.
 - 9. Manual hand chain lift operation.
 - 10. Locking Devices: Lock and latch handle on outside.

2.2 MATERIALS

- A. Curtain Construction: Interlocking, single thickness slats.
 - 1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.

2. Curtain Bottom: Fitted with extruded stainless steel continuous channel or tubular shape to provide reinforcement and positive contact in closed position.
 3. Steel Slats: ASTM A653/A653M galvanized steel sheet, with minimum G90/Z275 coating; minimum thickness 16 gage, 0.06 inch.
- B. Hood Enclosure: Internally reinforced to maintain rigidity and shape.
 - C. Cylindrical Locking Mechanism: Latchset lock cylinder keyed to building Best Lock masterkey program, specified in Section 08 71 00.
 - D. Latching Mechanism: Inside mounted, adjustable keeper, spring activated latch bar feature to keep in locked or retracted position.
 - E. Latch Handle: Manufacturer's standard.
 - F. Roller Shaft Counterbalance: Steel pipe and torsion steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.
 - G. Integral Frame, Hood, and Fascia: Provide manufacturer's standard welded assemblies; fabricate of not less than 0.0625-inch-thick, stainless-steel sheet, Type 300 series, complying with ASTM A 240 or ASTM A 666.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that opening sizes, tolerances and conditions are acceptable.

3.2 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 92 00.

3.3 ADJUSTING

- A. Adjust operating assemblies for smooth and noiseless operation.

3.4 CLEANING

- A. Clean installed components.
- B. Remove labels and visible markings.

END OF SECTION

SECTION 08 33 23 - OVERHEAD COILING DOORS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Overhead coiling doors, operating hardware, non-fire-rated and exterior; manually or electrically operated.
- B. Wiring from electric circuit disconnect to operator to control station.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction, electrical equipment, and component connections and details.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Samples: Submit two slats, length of 24 inch in size illustrating shape, color and finish texture.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content steel or aluminum: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
- F. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.3 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by testing firm acceptable to authorities having jurisdiction as suitable for purpose specified.

1.4 WARRANTY

- A. Warranty Period: Two years for defects in material and workmanship.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Cornell Iron Works, Inc: www.cornelliron.com.
- B. The Cookson Company: www.cooksondoor.com.
- C. Overhead Door Company: www.overheaddoor.com/commercial-doors.

2.2 COILING DOORS

- A. Exterior Coiling Doors: Steel slat curtain.
 - 1. Capable of withstanding positive and negative wind loads of 20 psf, without undue deflection or damage to components.
 - 2. Sandwich slat construction with insulated core of foamed-in-place polyurethane insulation; minimum R-value of 8.1.
 - 3. Nominal Slat Size: 2 inches wide x required length.
 - 4. Finish: primed steel with powder coated finish..
 - 5. Guide, Angles: Primed steel.

6. Hood Enclosure: Manufacturer's standard; primed steel with powder coated finish.
 7. Electric operation.
 8. Mounting: Surface mounted.
- B. Non-Fire-Rated Interior Coiling Doors: Steel slat curtain.
1. Single thickness slats.
 2. Nominal Slat Size: 2 inches wide x required length.
 3. Finish: Galvanized.
 4. Guides, Angles: Galvanized steel.
 5. Hood Enclosure: Manufacturer's standard; primed steel.
 6. Electric operation.
 7. Mounting: Surface mounted.

2.3 MATERIALS AND COMPONENTS

- A. Curtain Construction: Interlocking slats.
1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
 2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
 3. Weatherstripping: Moisture and rot proof, resilient type, located at jamb edges and where curtain enters hood enclosure of exterior doors.
- B. Steel Slats: Minimum thickness, 20 gage, .036 inch; ASTM A653/A653M galvanized steel sheet.
1. Galvanizing: Minimum G90 coating.
- C. Steel Guides: Minimum 3/16 inch angle assemblies bolted to wall; powder coat finish.
- D. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

2.4 ELECTRIC OPERATION

- A. Electric Operators:
1. Mounting: Side mounted.
 2. Motor Enclosure:
 3. Motor Rating: 1/2 hp; continuous duty.
 4. Motor Voltage: 120 volts, single phase, 60 Hz.
 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 6. Controller Enclosure: NEMA 250, Type 1.
 7. Opening Speed: 12 inches per second.
 8. Brake: Adjustable friction clutch type, activated by motor controller.
 9. Manual override in case of power failure.
 10. Refer to Division 26 for Electrical connections.
- B. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator conforming to UL 325.
1. 24 volt circuit.
 2. Surface mounted, at interior door jamb.
 3. Provide key switch control station on exterior; location to be determined.
- C. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Section 26 05 83.
- F. Complete wiring from disconnect to unit components.
- G. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 92 00.

3.2 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.
- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.3 ADJUSTING

- A. Adjust operating assemblies for smooth and noiseless operation.

3.4 CLEANING

- A. Clean installed components.
- B. Remove labels and visible markings.

END OF SECTION

SECTION 08 43 13 - ALUMINUM-FRAMED STOREFRONTS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Fixed and venting punched openings.
- D. Weatherstripping.
- E. Frame mounted sun shades.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.3 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; 2016.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- H. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- K. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - 1. Design Wind Loads: Comply with requirements of IBC 2015 - International Building Code.
 - 2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

- B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
- C. Energy Performance: Structural-sealant-glazed curtain walls shall have certified and labeled energy performance ratings according to NFRC.
 - 1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.37 with 0.29 center-of-glass U value as determined according to NFRC 100.
 - 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a SHGC of no greater than 0.36 or better as determined according to NFRC 200.
 - 3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa)
 - 4. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified CR rating of no less than 60 as determined according to NFRC 500. Prevent condensation under the following conditions:
 - a. Outdoor ambient temperature of 22.3 deg F (5.9 deg C) at 4.2 mph.
 - b. Indoor ambient air temperature of 70 deg F (21 deg C), with 50 percent relative humidity.
- D. Water Leakage - Typical: None, when measured in accordance with ASTM E 331 with a test pressure difference of 12 lbf/sq ft.
 - 1. Water Leakage - North Wall Area B, Music Wing: None, when measured in accordance with ASTM E 331 with a test pressure difference of 8 lbf/sq ft.
 - 2. Rooms Dance Studio B101, Choral/Keyboard/Guitar B102 and Band/Orchestra Room B103.
- E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
 - 1. Shop drawings must be prepared by the manufacturer under the supervision of a Professional Structural Engineer.
 - 2. Shop drawings must be signed and sealed by the supervising Professional Structural Engineer.
- D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations, including the impact of the frame mounted sunshades.
 - 1. Must be signed and sealed by the supervising Professional Structural Engineer.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations

- a. For storefront, if applicable: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content steel or aluminum in storefront: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 3. MR Credit 4: BPDO - Material Ingredients
 - a. For storefront, if applicable: Material Ingredient Report.
 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied sealants and sealants primers: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
- F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Maryland.
- B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.7 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.9 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Kawneer North America; TriFab VG 451UT (exterior) and TriFab VG 451 (interior):
www.kawneer.com.

- B. Oldcastle BuildingEnvelope; Series 3000XT (exterior) and Product FG-3000 (interior):
www.oldcastlebe.com.
- C. YKK AP America; Product System YES 45 XT (exterior) and Product System YES 45 FI
(interior): www.ykkap.com.

2.2 STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Glazing Position: Centered (front to back).
 - 2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
 - 3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 - 4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 - 5. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 - 6. Sill Flashing: Provide manufacturers full height high performance sill flashing.

2.3 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 - 1. Framing members for interior applications need not be thermally broken.
 - 2. Glazing Stops: Flush.
 - 3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Swing Doors: Glazed aluminum.
 - 1. Products: Thermally-improved doors.
 - a. YKK AP America Inc.
 - 1) Entrance System Doors - Thermally-broken: Model 35XT Megatherm; medium stile.
 - b. Kawneer North America; an Alcoa company.
 - 1) Entrance System Doors: AA 250 Thermal Entrances or 360 Insulclad Thermal Entrances; Contractor option.
 - c. Oldcastle BuildingEnvelope Vistawall Architectural Products.
 - 1) Entrance System Doors: AD-375 Thermal Entrance.
 - 2. Glazing Stops: Square.
- C. Sun Shades: Shop fabricated, shop finished, extruded aluminum outriggers, louvers, and fascia, free of defects impairing strength, durability or appearance.
 - 1. Products:
 - a. Kawneer; Versoleil SunShade.
 - b. Oldcastle BuildingEnvelope Vistawall Architectural Products; Solar Eclipse.
 - c. YKK; ThermaShade.
 - 2. Louver Type: 6" Airfoil.
 - 3. Outrigger Shape: Straight.
 - 4. Fascia: 3 1/2 inch square.
 - 5. Design Criteria: Design and fabricate to resist the same loads as storefront system as well as the following loads without failure, damage, or permanent deflection:
 - a. Snow: 30 psf; minimum.

- b. Live: 30 psf; minimum.
 - c. Thermal Movement: Plus/minus 1/8 inch, maximum.
 - 6. Size: 24 inch projection.
 - 7. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.
- D. Vents: Provide project-out units.
- 1. The windows shall be Architectural Aluminum Project Out windows in accordance with ANSI/AAMA/nwwda 101/I.S.2-97 or NAFS-1 Voluntary Specifications for Aluminum and Poly Prime Windows and Glass Doors for a Class and Grade of P-HC40 to P-HC70 for Project Out Windows.
 - a. Units submitted for laboratory testing shall be manufacturer's standard construction, glazed and assembled in accordance with manufacturer's specifications and ANSI/AAMA/nwwda 101/I.S.2-97 or NAFS-02.
 - 2. Hinge: Concealed stainless steel four- or six-bar friction hinge; two per ventilator.
 - 3. Lock: Manufacturer's cam lock and keeper.
 - 4. Opening Limiter: Provide opening limiter on all operable vents, limiting size to be coordinated with Owner and Authorities Having Jurisdiction.
 - 5. Finish to match framing system.
 - 6. Products:
 - a. Kawneer; GLASSvent.
 - b. Oldcastle BuildingEnvelope Vistawall Architectural Products; Zero Sightline 2750.
 - c. YKK; YES SSG Vent.
 - 7. Insect Screens: Extruded aluminum frames, 6063-T5 alloy and temper, joined at corners; 18 x 16 mesh aluminum screen cloth; splines shall be extruded vinyl, removable to permit rescreening.
 - a. Frame Finish: To match aluminum window.
 - b. Screen Finish: Black anodized.
- E. Strap Anchor: Aluminum extrusion with thermal separation designed to engage frame and tie assembly to supporting construction as represented on Drawings; delegated design.

2.4 MATERIALS

- A. Recycled content: Provide aluminum and steel components with recycled content.
- B. Interior wet-applied sealants and sealant primers: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
- C. Extruded Aluminum: ASTM B221 (ASTM B221M).
- D. Sheet Aluminum: ASTM B209 (ASTM B209M).
- E. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- F. Fasteners: Stainless steel.
- G. Exposed Flashings: Aluminum sheet, 14 gage, 0.064 inch minimum thickness; finish to match framing members.
- H. Concealed Flashings: 0.018 inch thick stainless steel.
- I. Perimeter Sealant: Section 07 92 00.
- J. Glass: As specified in Section 08 8000.
- K. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- L. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.5 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.6 HARDWARE

- A. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- B. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

2.7 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Construct with shear block system of assembly.
- D. Prepare components to receive anchor devices. Fabricate anchors.
- E. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- F. Arrange fasteners and attachments to conceal from view.
- G. Reinforce framing members for imposed loads.
- H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.2 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- J. Install operating sash.
- K. Set thresholds in bed of sealant and secure.

- L. Install hardware using templates provided.
- M. Install glass and infill panels in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
- N. Install perimeter sealant in accordance with Section 07 92 00.
- O. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

- A. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
 - 3. Test a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect, before installation of interior finishes; test area may not show evidence of water penetration.

3.5 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 44 13 - GLAZED ALUMINUM CURTAIN WALLS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Aluminum-framed curtain wall, with vision glazing and metal infill panels.
- B. Column covers.
- C. Perimeter sealant.
- D. Frame mounted sun shades.

1.2 PROJECT REQUIREMENTS

- A. Mullion depths must remain constrained to depths within 1/2-inch as indicated on Drawings; provide engineering and internal reinforcement as required to remain no greater than these constraints; coordinate allowed variation from Drawing depths with related trades.
- B. System to be factory prepared with the components factory cut for the Project; cutting within the installers shop will not be accepted. Contractor has the option of having the framing fully fabricated by the manufacturer for field glazing.

1.3 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Perimeter sealant and back-up materials.

1.4 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; 2016.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- H. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- K. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015a.
- L. ASTM C1184 - Standard Specification for Structural Silicone Sealants; 2014.
- M. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.5 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand the following load requirements without damage or permanent set:
 - 1. Design Wind Loads: Comply with requirements of IBC 2015 - International Building Code.
 - 2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, and maximum of 3/4 inch, with full recovery of glazing materials.
 - 3. Measure performance by testing in accordance with ASTM E 330, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
- B. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - 1. Movement of curtain wall relative to perimeter framing.
 - 2. Deflection of structural support framing, under permanent and dynamic loads.
- C. Energy Performance: Structural-sealant-glazed curtain walls shall have certified and labeled energy performance ratings according to NFRC.
 - 1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.37 with 0.29 center-of-glass U value as determined according to NFRC 100.
 - 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a SHGC of no greater than 0.36 or better as determined according to NFRC 200.
 - 3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa)
 - 4. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified CR rating of no less than 60 as determined according to NFRC 500. Prevent condensation under the following conditions:
 - a. Outdoor ambient temperature of 22.3 deg F (5.9 deg C) at 4.2 mph.
 - b. Indoor ambient air temperature of 70 deg F (21 deg C), with 50 percent relative humidity.
- D. Water Leakage: None, when measured in accordance with ASTM E 331 at a test pressure difference of 15 lbf/sq ft.
- E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
- G. Design system to eliminate noises caused by wind and thermal movement, to prevent vibration harmonics, and to prevent "stack effect" in internal spaces.

1.6 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

1. Shop drawings must be prepared by the manufacturer, under the supervision of a Professional Structural Engineer.
 2. Shop drawings must be signed and sealed by the supervising Professional Structural Engineer.
- D. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- E. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations. Accommodate impact by attached sun shades in design.
1. Engineering calculations must be signed and sealed by the supervising Professional Structural Engineer.
- F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- G. LEED Submittals: Comply with Section 018113.
1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For storefront, if applicable: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content steel or aluminum in storefront: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 3. MR Credit 4: BPDO - Material Ingredients
 - a. For storefront, if applicable: Material Ingredient Report.
 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied sealants and sealants primers: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
- H. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State of Maryland.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.

1.8 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.10 FIELD CONDITIONS

- A. Contractor is responsible for coordination of dimensions and field measurements required by trade contractors.
- B. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.11 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 10 year period after Date of Substantial Completion.
- C. Provide 10 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.
- D. Warranty for all components must be direct from the manufacturer (non pass-through) and non pro-rated for the entire term.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Kawneer North America; 1600 UT System 1: www.kawneer.com/#sle.
- B. Oldcastle BuildingEnvelope Vistawall Architectural Products; Product Reliance HTC: www.oldcastlebe.com.
- C. YKK AP America; Product YCW 750 XT: www.ykkap.com.

2.2 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 - 2. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 - 3. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

2.3 COMPONENTS

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Outside glazed, with pressure plate and mullion cover.
 - 2. Include several profiles for exterior covers as indicated; no variation in snap cover design is permitted.
- B. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 - 1. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- C. Glazing: As specified in Section 08 80 00.
- D. Sun Shades: Shop fabricated, shop finished, extruded aluminum outriggers, louvers, and fascia, free of defects impairing strength, durability or appearance.
 - 1. Products:

- a. Kawneer; Versoleil SunShade.
 - b. Oldcastle BuildingEnvelope; Product Solar Eclipse.
 - c. YKK; ThermaShade
 2. Louver Type: 6" Airfoil.
 3. Outrigger Shape: Straight.
 4. Fascia: 3 1/2 inch square.
 5. Design Criteria: Design and fabricate to resist the same loads as storefront system as well as the following loads without failure, damage, or permanent deflection:
 - a. Snow: 30 psf; minimum.
 - b. Live: 30 psf; minimum.
 - c. Thermal Movement: Plus/minus 1/8 inch, maximum.
 6. Size: 24 inch projection.
 7. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.
- E. Column Covers: Aluminum, 14 gage, 0.064 inch minimum thickness, finish to match curtain wall framing members.
- F. Strap Anchor: Aluminum extrusion with thermal separation designed to engage frame and tie assembly to supporting construction as represented on Drawings; delegated design.

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Structural Supporting Anchors Attached to Structural Steel: Design for bolted attachment.
- E. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- F. Exposed Flashings: 0.063 inch thick aluminum sheet; finish to match framing members.
- G. Concealed Flashings: 0.018 inch thick stainless steel.
- H. Structural Glazing Adhesive: Silicone, neutral cure; formulated specifically for structural sealant glazing and complying with ASTM C1184.
1. Ultraviolet radiation resistant for 2000 to 4000 micro-watts minimum for 21 days.
 2. Adhesion when subjected to ultraviolet radiation through glass in accordance with ASTM C794 without failure.
 3. Minimum adhesion tensile strength of 100 psi.
 4. Tested for compatibility with glazing accessories and weatherseal sealant.
 5. Adhesives applied within the building waterproofing envelope: Comply with low-emitting requirements specified in Section 01 61 16.
- I. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- J. Perimeter Sealant: Section 07 92 00.
- K. Glazing: As specified in Section 08 80 00.
- L. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- M. Glazing Accessories: As specified in Section 08 80 00.
- N. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.5 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.6 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- E. Arrange fasteners and attachments to conceal from view.
- F. Reinforce framing members for imposed loads.
- G. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.2 INSTALLATION

- A. Install curtain wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- H. Pressure Plate Framing: Install glazing and infill panels in accordance with Section 08 80 00, using exterior dry glazing method.
- I. Install perimeter sealant in accordance with Section 07 90 05.
- J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.4 FIELD QUALITY CONTROL

- A. Water-Spray Test: Provide water spray quality test of installed curtain wall components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
 - 3. Test a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect, before installation of interior finishes; test area may not show evidence of water penetration.
- B. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance conforms to specified requirements.

3.5 ADJUSTING

- A. Adjust operating sash for smooth operation.

3.6 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 45 13 - STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes aluminum-framed assemblies glazed with translucent polycarbonate panels as follows:
 - 1. Canopy assemblies.
- B. Design, manufacture and installation of Standing Seam Monolithic Polycarbonate system. An assembly of extruded polycarbonate glazing panels incorporated into a complete aluminum framed system that has been tested and warranted by the manufacturer as a single source system.
- C. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at project site.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum components of panel assemblies.
- B. LEED Submittals:
 - 1. Product Data: For sealants, indicating VOC content.
 - 2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
 - 3. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
- C. Shop Drawings: For panel assemblies.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior.
- D. Samples: In manufacturer's standard size.
 - 1. For each type of structured-polycarbonate panel.
 - 2. For each type of exposed finish for framing members.
- E. Delegated Design Submittal: For panel assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Qualification Data: For qualified installer.
- G. Product Test Reports: For each translucent polycarbonate-panel assembly, for tests performed by a qualified testing agency.
- H. Evaluation Reports: For translucent polycarbonate-panel assemblies from ICC-ES.
- I. Field quality-control reports.
- J. Sample Warranties: For special warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For panel assemblies to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Field Measurements: Where translucent canopy panels are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of panel assemblies that fail in materials or fabrication workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - c. Water leakage.
 - d. Warranty Period: Five years from date of Substantial Completion.
- B. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace translucent polycarbonate panels that exhibit defects in materials or workmanship within specified warranty period.
 - 1. Defects include, but are not limited to, the following:
 - a. Delamination.
 - b. Color changes exceeding requirements.
 - c. Losses in light transmission beyond 6 percent from original when measured after 10 years according to ASTM D 1003.
 - d. Warranty Period: 10 years from date of Substantial Completion.
 - e. Warranty Period for Hail Damage: Five years from date of Substantial Completion for hail stone penetration exceeding requirements.
- C. Special Aluminum-Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
 - 1. Failures include, but are not limited to, checking, crazing, peeling, chalking, and fading of finishes.
 - 2. Warranty Period: 20 years from date of Substantial Completion.
- D. Installer's Warranty: Installer agrees to repair or replace components of panel assemblies that fail in installation workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, installation defects and water leakage.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design translucent polycarbonate-panel assemblies.
- B. Structural Loads: As indicated on Drawings.
- C. Deflection Limits:

1. Overhead Panel Assemblies: Limited to 1/60 of clear span for each assembly component of aluminum framing and panel joint in accordance with IBC Table 1604.3, footnote h.
- D. Structural-Test Performance: Panel assemblies tested according to ASTM E 330, as follows:
 1. When tested at positive and negative wind-load design pressures, assemblies do not show evidence of deflection exceeding specified deflection limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not show evidence of material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E. Hail Stone Impact Resistance: Panel assemblies that resist penetration by hail stone smaller than 1-3/16 inch (30 mm) diameter, impacting panel surface at a final velocity up to 44 ft/sec (13.4 m/s) per ASTM E 822.
- F. Panel Clip Performance: Corrosion-resistant clips tested to meet a minimum 90 lb/sq. ft. (4.3 kPa) wind uplift when tested according to ASTM E 330.
- G. Panel Performance:
 1. Smoke-Developed Index: 450 or less according to ASTM E 84, or 75 or less according to ASTM D 2843.
 2. Flame Spread: 25 or less when tested according to ASTM E 84.
 3. Combustibility Classification: Class CC1 based on testing according to ASTM D 635.
 4. Thermal Aging: When exposed to 300 deg F (149 deg C) for 25 minutes, exterior panels tested in accordance with ASTM D 2244.
 - a. Color Retention: 0.75 (Hunter) units ?E maximum fade.
 - b. Color Darkening: 0.3 (Hunter) units ?L maximum.
 - c. Cracking or Crazeing: None when exposed to 300 deg F (149 deg C) for 25 minutes.
 - d. Delamination: None when exposed to 300 deg F (149 deg C) and 0 deg F (-17.8 deg C) for 25 minutes.
 - e. Concentrated Loading: No damage while applying a load of 600 lbf (813.5 Nm) over 1 sq. ft. when tested according to OSHA, 29 CFR Section 1910.23(e)(8); and no damage while applying a load of 400 lbf (542.3 Nm) over 3 inches (152 mm) in diameter according to ASTM E 661.
- H. Water Penetration under Static Pressure: Provide panel assemblies that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- I. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 TRANSLUCENT POLYCARBONATE-PANEL ASSEMBLIES

- A. Translucent Polycarbonate-Panel Assemblies: Translucent assemblies that are supported by aluminum framing and glazed with translucent polycarbonate panels.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide CPI Daylighting, Inc.; BriteWay-U-Lite or a comparable product by one of the following:
 - a. DuoGard.
 - b. Extech.

c. Wasco.

2.3 TRANSLUCENT POLYCARBONATE CANOPY PANELS

- A. Translucent, Monolithic Solid Polycarbonate Panel Assembly: Consisting of monolithic, solid cross-section polycarbonate standing seam glazing panels with batten panel connectors, providing coextruded UV protection. Incorporate glazing panel system into a complete aluminum framed assembly.
- B. Monolithic Polycarbonate Panels: Extruded polycarbonate sheet (not cellular) that is coextruded with a UV-protective layer.
- C. Panel Thickness: Overall minimum 0.158 inch (4 mm).
- D. UV Resistance: Coextruded on exposed surfaces during glazing panel manufacture.
- E. Color:
 - 1. Monolithic, Solid Glazing Panel Color: As selected by Architect from manufacturer's full range.

2.4 ALUMINUM FRAMING SYSTEMS

- A. Components: Manufacturer's standard extruded-aluminum members of thickness required and reinforced as required to support imposed loads.
- B. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.
 - 1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - 3. Extruded Structural Pipe and Tubes: ASTM B 429 (/B 429M).
 - 4. Structural Profiles: ASTM B 308 (/B 308M).
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.
- D. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding fasteners and accessories; compatible with adjacent materials.
 - 1. At closures, retaining caps, or battens, use ASTM A 193 (/A 193M), 300 series stainless-steel screws.
 - 2. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.
- E. Concealed Flashing: Corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- F. Exposed Flashing and Closures: Aluminum sheet not less than 0.040-inch (1.02-mm) thick, finished to match framing.
- G. Framing Gaskets: Manufacturer's standard gasket system with low-friction surface treatment designed specifically for retaining translucent polycarbonate panels.
- H. Frame-System Sealants: As recommended in writing by manufacturer.
 - 1. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- I. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 FABRICATION

- A. Fabricate aluminum components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Internal guttering systems or other means to drain water passing through joints and moisture migrating within assembly to exterior.
- B. Fabricate aluminum sill closures with weep holes and for installation as continuous component.
- C. Reinforce aluminum components as required to receive fastener threads.

2.6 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Two-coat AAMA 2605, polyester finish. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions.
 - 1. Do not install damaged components.
 - 2. Fit joints between aluminum components to produce hairline joints free of burrs and distortion.
 - 3. Rigidly secure nonmovement joints.
 - 4. Install anchors with separators and isolators to prevent metal corrosion, electrolytic deterioration, and immobilization of moving joints.
 - 5. Seal joints watertight unless otherwise indicated.
- B. Metal Protection: Where aluminum components will contact dissimilar materials, protect against galvanic action by painting contact surfaces with corrosion-resistant coating or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.
- C. Install components plumb and true in alignment with established lines and elevations.
- D. Erection Tolerances: Install panel assemblies to comply with the following maximum tolerances:
 - 1. Alignment: Limit offset from true alignment to 1/32 inch (0.8 mm) where surfaces abut in-line, edge-to-edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3 inches (76 mm); otherwise, limit offset to 1/8 inch (3.2 mm).
 - 2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3.2 mm in 3.7 m), but no greater than 1/2 inch (12 mm) over total length.

3.3 FIELD QUALITY CONTROL

- A. Repair or remove work where inspections indicate that it does not comply with specified requirements.
- B. Prepare inspection reports.

3.4 CLEANING

- A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, clean wiping cloths. Always test a small area before applying to the entire area.
- B. Follow strict panel manufacturer guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use.
- C. Installers shall leave panel system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

END OF SECTION

SECTION 08 63 00 - METAL-FRAMED SKYLIGHTS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Aluminum skylight framing system.
- B. Fasteners, anchors, reinforcement, and flashings.

1.2 REFERENCE STANDARDS

- A. American Architectural Manufacturers Association:
 - 1. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure; 2017.
 - 2. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
 - 3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
 - 4. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- B. ASTM International:
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
 - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
 - 3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 4. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
 - 5. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
 - 6. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
 - 7. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
 - 8. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015a.
 - 9. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
 - 10. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014a.
 - 11. ASTM C1401 - Standard Guide for Structural Glazing.
 - 12. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).
 - 13. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
 - 14. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2012).
 - 15. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

16. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.
- C. Aluminum Association:
 1. AA DAF-45 - Designation System for Aluminum Finishes.
- D. American Society of Civil Engineers (ASCE):
 1. SEI/ASCE 7-02 Minimum Design Loads for Buildings and Other Structures.
- E. Federal Specification Unit:
 1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- F. Comply with the International Building Code and ASCE 7-98.
- G. Factory Mutual.

1.3 DESIGN REQUIREMENTS

- A. Comply with the International Building Code 2015 and ASCE 7-98 or where required by this Section, exceed the code. Nothing in this Section shall be construed as allowing or requiring noncompliance with code.
- B. System Design: Design and size components to withstand the following load requirements as measured in accordance with ASTM E330:
 1. Roof Snow Load: 30 lbf/sq ft + Drifting Effects.
 2. Positive and Negative Wind Load: Comply with the International Building Code and ASCE 7-98.
 3. Concentrated load at any location on framing: 250 lb.
- C. Deflection: Design and size components for maximum allowable deflection of glazing support member of 1/175 of span or a maximum of 1 inch.
- D. Movement: Design system to limit stress on elastomeric sealants to 20 percent of tested tensile adhesion and maximum compression or elongation to 25 percent of neutral dimension.
- E. Expansion/Contraction: Design system to accommodate thermal expansion and contraction over ambient temperature range of minus (-) 30 degrees F and exterior metal temperature of 180 degrees F for dark colors or 150 degrees F for light colors; interior temperature range of 55 degrees F and 100 degrees F; dynamic loading and release of loads, and deflection of structural support framing without damage to skylight system components or loss of weathertightness.
- F. Thermal Resistance of Assembly: Maximum U Value of 0.45 Btu/sq ft per hour per deg F when measured in accordance with AAMA 1503.
- G. Limit air infiltration through assembly to 0.06 cu ft/min/sq ft for glazed area, measured at reference differential pressure across assembly of 6.24 psf in accordance with ASTM E283.
- H. Water Leakage: None, when measured in accordance with ASTM E331 at static pressure of 6.24 lbf/sq ft.
- I. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.
- J. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by metal-framed skylight assemblies without failing adhesively or cohesively. Sealant fails cohesively before sealant releases from substrate when tested for adhesive compatibility with each substrate and joint condition required.
 1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.

2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications, standard details, and installation requirements.
- C. Shop Drawings: Include required sets prepared by or under the supervision of a professional engineer licensed in the State of Maryland. Indicate framed opening requirements and tolerances, spacing of all members, framing member profiles, anticipated deflection under load, affected related Work, expansion and contraction joint locations and details, and identify shop and field welds by AWS Welding Symbols, A2.0.
- D. Samples: Submit two samples, not less than 12 by 12 inch in size illustrating appearance of prefinished aluminum and specified glazing system, including glazed edge and corner.
- E. Test Reports: Indicate substantiating engineering data, test reports of previous testing of similar assemblies meeting performance criteria, and other supporting data.
- F. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations.
- G. Structural Glazing Adhesive: Submit product data and calculations showing compliance with performance requirements.
- H. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- I. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- J. Manufacturer's Installation Instructions: Indicate special procedures, safety precautions, and perimeter conditions requiring special attention.
- K. Compatibility Test Reports: For structural-sealant-glazed skylights, preconstruction test reports from structural- and nonstructural-sealant manufacturer indicating that materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results for sealant performance and written recommendations for primers and substrate preparation needed for adhesion.
- L. Preconstruction Testing Program: For metal-framed skylight assemblies, developed specifically for Project.
- M. Structural-Sealant-Glazing, Quality-Control Program: Developed specifically for Project.
- N. Structural-Sealant-Glazing, Quality-Control Program Reports: Documenting quality-control procedures and verifying results for metal-framed skylights.
- O. Field quality-control test and inspection reports.

1.5 QUALIFICATIONS

- A. Designer Qualifications: Design skylight system under direct supervision of a professional engineer experienced in design of system type specified and licensed in the State of Maryland.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with not fewer than three years of documented experience.
- C. Installer Qualifications: Company specializing in performing the type of work specified in this section with not fewer than five years of documented experience.

1.6 QUALITY ASSURANCE

- A. Compatibility Testing: For structural-sealant-glazed skylights, perform structural- and nonstructural-sealant manufacturer's standard preconstruction tests for compatibility and adhesion of sealants with each material that will come in contact with sealants and each condition required by metal-framed skylights.
 - 1. Test a minimum of five samples of each metal, glazing, and other material.
 - 2. Prepare samples using techniques and primers required for installed skylights.
 - 3. For materials that fail tests, determine corrective measures required to prepare each material to ensure compatibility with and adhesion of sealants, including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for each material, retest materials.
- B. Structural-Sealant Glazing: Comply with recommendations in ASTM C 1401, "Guide for Structural Sealant Glazing," for joint design and quality-control procedures.
 - 1. Joint designs are reviewed and approved by structural-sealant manufacturer.
 - 2. Quality-control program development and reporting are Project specific and comply with ASTM C 1401 recommendations for material qualification procedures, preconstruction sealant-testing program, and procedures and intervals for fabrication and installation reviews and checks.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Provide wrapping to protect prefinished aluminum surfaces. Do not use adhesive papers or spray coatings that bond when exposed to sunlight or weather.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.9 COORDINATION

- A. Coordinate the Work with installation of roofing system and structural curb.
- B. Coordinate the Work with continuity of vapor barrier.

1.10 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal framed skylight assemblies that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
 - 2. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Thermal movements.
 - c. Movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - d. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
 - e. Noise or vibration created by wind and thermal and structural movements.
 - f. Loosening or weakening of fasteners, attachments, and other components.
 - g. Sealant (including structural silicone) loss of adhesion, loss of cohesion, cracking or discoloration.
 - h. Glass Breakage Including: Secondary breakage caused by falling glass; spontaneous breakage of heat treated glass.

- i. Failure of insulating glass edge seal as evidenced by frost, condensation, water, dust, corrosion or reflective coating damage within sealed air space.
 - j. Insulating glass spacer migration.
 - k. Delamination or discoloration of laminated glass or panels.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. A. Basis-of-Design Product: The design for metal framed skylights is based on Total Flush Glazed System by Super Sky Products, Inc.; www.supersky.com. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
1. Oldcastle Building Envelope: www.oldcastlebe.com.
 2. CPI
 3. Imperial Glass Structures.
 4. LinEl Signature.
 5. Acurlite Structural Skylights, Inc.

2.2 SKYLIGHT COMPONENTS

- A. Frame: Extruded aluminum structural members with integral condensation collection and guttering system thermally separated from exterior metal components. Give preference to products having recycled content.
- B. Glazing System: Four-sided structural adhesive glazed, factory-installed.
- C. Glazing: Insulating glass.

2.3 MATERIALS

- A. Aluminum Extrusions: Alloy and temper 6063-T5, 6063-T6, or 6061-T6 members complying with ASTM B221 (ASTM B221M), with minimum thickness 1/8 inch for structural members and 1/16 inch for non-structural members.
- B. Formed Aluminum: Sheet material of alloy 5052, 5005, or 6061-T651 members complying with ASTM B209 (ASTM B209M), with minimum thickness 1/8 inch for structural members and 1/16 inch for non-structural members.
- C. Internal Reinforcement: ASTM A36/A36M; Steel shapes as required for strength and mullion size limitations, hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
- D. Glass: Conform with requirements specified in Section 08 80 00. Sealed insulated units, outer pane of clear transparent or tinted, heat strengthened glass; inner pane of clear transparent or translucent, laminated glass; space of sealed air, metal edge frame.
1. Outer Pane to match insulating units in storefront and window; inner pane of clear laminated glass.
- E. Glazing Accessories: As standard with manufacturer of skylight system conforming with requirements specified in Section 08 80 00.
- F. Structural Glazing Adhesive: Silicone, ASTM C920, Class 25, Grade NS, neutral cure; maximum hardness of 30, when tested in accordance with ASTM D2240 using Type A durometer; minimum tensile strength of 250 psi, when tested in accordance with ASTM D412. Maximum VOC content of 100 g/L when applied on the building interior.

- G. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- H. Perimeter Sealant: Specified in Section 07 92 00.
- I. Touch-Up Primer for Galvanized Steel Surfaces: Zinc rich type.
- J. Protective Back Coating: Asphaltic mastic, ASTM D4479/D4479M, Type I.
- K. Fasteners: Stainless steel.
- L. Flashings: 0.063 inch thick aluminum, same finish as system components; secured with concealed fastening method.
- M. Anchorage Devices: Type recommended by manufacturer, and required by professional engineer's design.

2.4 FABRICATION

- A. Insofar as possible, fit and assemble work in the manufacturer's shop. In so far
- B. Make joints rigid, with connections that are flush, hairline, and weatherproof.
- C. Rigidly fit and secure joints and corners with screw and spline; fabricate rigid joints with connections that are flush, hairline, and weatherproof.
- D. Fabricate components to allow for expansion and contraction with minimum clearance and shim spacing around perimeter of assembly.
- E. Maintain continuous air and vapor barrier throughout assembly, with the barrier plane aligned with inside pane of glazing continuing to a heel bead of glazing sealant.
- F. Drain to exterior any water entering exterior joints, condensation occurring in glazing channels, or migrating moisture occurring within system.
- G. Prepare components to receive concealed anchorage devices, and ensure that fasteners will be concealed upon completion of installation.
- H. Adhere glass to glazing frames with structural adhesive and cure under controlled conditions in shop. Field glazing of frames to glass is not acceptable.

2.5 FINISHES

- A. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system; custom color to match approved sample for color and gloss.
 - 1. Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, with both color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight.
 - a. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers' written instructions.
- B. Galvanizing: ASTM A123; minimum 1.2 oz/sq ft coating thickness; galvanize after fabrication.
- C. Galvanizing for Nuts, Bolts and Washers: ASTM A153.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that structural curb is ready to receive skylight system. Coordinate installation of roofing and other adjacent work to ensure weathertight construction.

3.2 PREPARATION

- A. Apply 1 coat of protective coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

3.3 INSTALLATION

- A. Install metal-framed skylights in accordance with manufacturer's instructions.
- B. Set skylight structure plumb, level, and true to line, without warp or rack of frames or glazing panels. Anchor securely in place in accordance with approved shop drawings.
- C. Maintain assembly dimensional tolerances, aligning with adjacent work.
- D. Apply minimum 1 coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar metals.
- E. Install sill flashings.
- F. Pack fibrous insulation in shim spaces at perimeter of assembly to ensure continuity of thermal barrier.
- G. Install glazing in accordance with Section 08 80 00.
- H. Mask adjacent surfaces, clean joint surfaces, and install backing and field-applied sealants in accordance with requirements of Section 07 92 00.
- I. Touch up damaged finishes so repair is imperceptible from 6 feet distance, and remove and replace components that cannot be acceptably touched up.

3.4 TOLERANCES

- A. Maximum Variation from Plumb, Level, or Line: 1/8 inch per 10 feet, or 3/8 inch total in overall dimension.
- B. Alignment of Two Adjoining Members Abutting in Plane: Within 1/16 inches.

3.5 FIELD QUALITY CONTROL

- A. Structural-Sealant Glazing: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, material qualification procedures, sealant testing, and fabrication reviews and checks.
- B. Structural-Sealant Compatibility and Adhesion: Test structural sealant according to recommendations in ASTM C 1401.
 - 1. Destructive test method, Method A, Hand Pull Tab (Destructive) in ASTM C 1401, Appendix X2, shall be used.
 - a. A minimum of two area(s) on each skylight face shall be tested.
 - b. Repair installation areas damaged by testing.
 - 2. Structural-Sealant Glazing Inspection: After installation of metal-framed skylights is complete, structural-sealant glazing shall be inspected and evaluated according to ASTM C 1401 recommendations for quality-control procedures.
- C. Water-Spray Test: Provide water spray quality test of installed metal-framed skylight components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
- D. The Owner may engage a testing agency to perform water penetration testing under static pressure according to ASTM E 1105; uniform and cyclic static air pressure.
 - 1. Water penetration must be none for acceptance of Work.

- E. Repair or remove Work where test results and inspections indicate that it does not comply with specified requirements.
- F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional Work with specified requirements.

3.6 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces; wipe surfaces clean.
- C. Remove excess sealant by methods recommended by skylight manufacturer.

END OF SECTION

**SECTION 08 7100
FINISH HARDWARE**

PART I - GENERAL

1.01 BID INFORMATION

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work specified in this section.
- B. Products of finish hardware supplied shall only be selected from manufacturers mentioned in this document. Hardware specified herein shall be considered precedent, and no substitutions will be entertained. The Owner, however, reserves the right to make changes at any time.

1.02 DESCRIPTION OF WORK:

- A. Refer to drawings, schedules and details for items requiring finish hardware. It is the intention of this section to include all finishing hardware required for the project, except for items which are specifically noted as being furnished elsewhere. Items not specifically mentioned, but necessary/required or consistent with other like conditions, must be furnished and shall be the same as like items of hardware specified.
- B. Furnish all labor, materials, tools, equipment and services necessary to complete the hardware work, as indicated on the drawings, specified, and as necessary or required to satisfactorily complete the project.
- C. Work includes furnishing of all finish hardware items necessary to complete the work shown on the drawings, except for those items specified to be provided under other sections of this specification. Work includes, but is not limited to, the following:
 - 1. Lock cylinders and keying.
 - 2. Locks and latches.
 - 3. Padlocks for roof hatches and mechanical/electrical gates.
 - 4. Push/Pull plates.
 - 5. Exit devices and panic hardware.
 - 6. Flush bolts.
 - 7. Floor closers and pivots.
 - 8. Surface closers.
 - 9. Hinges and butts/spring hinges.
 - 10. Stops.
 - 11. Protective plates.
 - 12. Thresholds.
 - 13. Weather-stripping, gasketing and silencers.
 - 14. Fasteners.
 - 15. Grills and screens.
 - 16. Saddles at joints in building and doors.
 - 17. Sliding door hardware.
 - 18. Bifold door hardware.
 - 19. Hold open hardware.

20. Automatic door seal (door bottom).
 21. Astragels/Meeting seals.
 22. Electrical security hardware.
 23. Smoke detectors.
 24. Continuous gear hinge.
 25. Removable mullions.
 26. Miscellaneous control devices
 27. Sound stripping
- D. Work Specified Elsewhere: Work specified to be provided under other sections include the following:
1. Hardware for metal windows.
 2. Hardware for toilet partitions.
 3. Toilet accessories.
 4. Hardware for operable walls and accordion partitions.
 5. Venetian blind hardware.
 6. Graphics (name plates).
 7. Stair treads.
 8. Handrail hardware.
 9. Corner guards.
 10. Access door hardware.
 11. Electrical system wiring.
 12. Hardware for lockers.
 13. Hardware for factory built cabinets and casework.
 14. Hardware for unit kitchen.
 15. Hardware for elevators.
 - a. Miscellaneous hardware

1.03 QUALITY ASSURANCE:

- A. The hardware supplier/installer shall, in the opinion of the Owner, have sufficient comparable experience (not less than five years) and an organization consisting of experienced members of The Door and Hardware Institute with Architectural Hardware Consultant status to properly handle, detail and service the hardware in a satisfactory manner. The supplier shall have in stock at all times sufficient material to take care of shortages and minor extras without delay. The supplier shall maintain a warehouse and office in the Washington Metropolitan area (75 mile radius) and be readily available to attend job meetings that may be required by the architect, Owner or general contractor. The definition of the Washington Metropolitan area is at the discretion of the Owner, and he reserves the right to exclude any supplier who, he feels, is too far away to provide proper service.
- B. The hardware supplier shall examine all drawings, schedules, details and relevant shop drawings, and furnish all hardware to suit. The supplier shall obtain all information required as to details, sizes, shapes, bevel thickness, etc. of doors and other items requiring hardware and make all hardware suitable for and of perfect fit as to type, style, size, thickness, hand, function, finish, etc. for each particular case. Where

practical applications cannot be made with the exact types of hardware specified, obtain the Owner's and Architect's permission to furnish suitable types having the same operative and functional features. Hardware for application on metal doors and frames and premortised wood doors shall be made for standard templates and necessary template information furnished as required. Inform contractor promptly of estimated time and dates that will be required to process submittals, to furnish templates, to deliver hardware, and to perform other work associated with furnishing door hardware for purposes of including this date in construction schedule. Comply with this schedule.

1.04 ALL ITEMS TO BE NEW & IN GOOD CONDITION, FREE OF DEFECTS.

1.05 SUBMITTALS:

- A. Submit five copies of a complete "Hardware Schedule" and product data showing all hardware to be furnished and the location for which it is intended to the Architect for review. A cover sheet shall be made part of the hardware schedule and shall list manufacturer of each item of hardware, hardware mounting heights, explanation of abbreviations, symbols, codes, etc. The schedule shall include all items required for the entire project and shall cover details as to proper type of strike plates, length of spindle, hand, backset and bevel of locks, hand and degree of opening for closers, length of kickplates, length of rods and flush bolts, type of door stop and other necessary information. The contractor shall assume sole responsibility for the provisions, proper coordination and function of the finish hardware required for all openings, whether or not hereinafter listed in the detail schedule. The Architect's and Owner's review of the hardware schedule shall not be construed as a complete check, nor shall it relieve the Contractor from responsibility for any errors, deviations or omissions from the requirements needed to satisfactorily complete the project.
- B. Submit schedule at earliest possible date, particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the project construction schedule. Allow three weeks for review after the Owner receives the schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
- C. Upon review and return of the finish hardware schedule, the hardware supplier will make corrections within two weeks and furnish necessary copies of detailed schedules and location of items to all parties concerned. Hardware supplier will also furnish product technical data sheets for each item of hardware, necessary template information and such other detailed information relative to the installation and maintenance of operating parts of this hardware to all who need them. List the hardware set number as well as the manufacturer's set number. Organize final hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - 1. Type, style, function, size, and finish of each hardware item.
 - 2. Name and manufacturer of each item.
 - 3. Fastening and other pertinent information.
 - 4. Location of each hardware set cross-referenced to indications on drawings, both on floor plans and in door and frame schedule.
 - 5. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 6. Mounting locations for hardware.
 - 7. Door and frame sizes and materials.
 - 8. Keying information.
 - a. Samples of the specified hardware shall be submitted for approval to the Owner.

1.06 COORDINATION:

- A. The hardware supplier shall consult the project drawing and details and otherwise familiarize themselves with the work to the end that all items of hardware furnished shall conform to units to which it is applied. He/she shall coordinate the hardware with other conflicting trades such as millwork metal doors and frames, etc. All doors, door hardware, and door frames are to be coordinated by ONE supplier. Any problem with delivery, interfacing or installation is the sole responsibility of the general contractor and their supplier.
- B. Immediately after the award of the hardware purchase order, it shall be the duty of the Contractor to request approved shop drawings from such trades with which the hardware must be coordinated.
- C. After receiving approved shop drawings, the Contractor shall promptly supply all template information, template drawings, approved hardware schedules, etc., as may be required to facilitate the progress of the job.

1.07 CONTRACTOR IS RESPONSIBLE FOR ALL MEANS, METHODS, COORDINATION AND SEQUENCING FOR THE PROJECT.

1.08 CODE CONFORMANCE:

- A. Finish hardware shall conform with all applicable codes and regulations, including requirements of:
 - 1. ANSI 4.139
 - 2. NFPA 80 - Fire Doors and Windows
 - 3. NFPA 101 - Life Safety Code
 - 4. Local and State Building Codes
 - 5. UL Labeled for Rated Doors
 - 6. DHI - Door and Hardware Institute
 - 7. SDI - Steel Door Institute
 - 8. AWI - Architectural Woodwork Institute
 - 9. IBC - International Building Code (Amended 2003)

1.09 FIRE-RATED OPENINGS:

- A. Where doors are indicated as labeled assemblies, provide only hardware which has been tested and listed by UL for the type, sizes, functions and labels of doors and frames shown or otherwise required by local code, in compliance with the BOCA-National Building Code (Amended), American Insurance Association, Pamphlet No. 80 and NFPA, Standard No. 80, current editions. This requirement takes precedence over other requirements for such hardware specified.

PART 2 - PRODUCTS

2.01 HINGES

- A. Template: Provide template produced units only that are manufactured in accordance with ANSI/BHMA A156.1-1988 Standards.
- B. Continuous Gear Hinge: All exterior doors shall have continuous gear hinges except to boiler rooms and outside storage rooms. Also provide continuous gear hinges on interior doors to multipurpose rooms, gymnasiums, auditoriums and media centers. Continuous gear hinges must be listed for use on 90-minute fire doors and frames as a minimum. Provide products from the following list of manufacturers:

Roton (Hager) #780-224HD

McKinney #MCK-24HD

Marka Products, Inc., #HG-315 (DELETED & REPLACE BY #FM 2011)

- C. Full Mortise Hinge: All remaining doors shall have heavyweight (minimum .190 ga.) hinges: five knuckle, four ball bearing, dull chrome (26D), full mortise type hinges.
- D. Size: Provide 4 1/2" x 4-1/2" hinges on doors to closets. Provide 4 1/2" x 4-1/2" hinges on all other doors also.
- E. Number of Hinges: Provide a minimum of three hinges for doors 90" or less in height and one additional hinge for each 30" of additional height.
- F. Screws: Provide manufacturer's standard screws. Use self-drilling structural fasteners (Drill Flex) to secure continuous hinges to grout-filled metal frames.
- G. Half Surface Hinge: Provide half-surface hinges on all fire-rated wood, mineral core doors. Use sleeve nuts and machine bolts (sex bolts) and 3" x 5" x .097 stainless steel protection plates to prevent crushing of the core materials and finished surface of the door, such as Hager No. 418.
- H. Quality: Provide top commercial grade products from the following list.
 - 1. Hager Hinge Co.
 - 2. McKinney Products Co.
 - 3. Stanley Hardware, Division Stanley Works.
 - 4. Bommer Industries, Inc.

2.02 LOCKS, CYLINDERS AND KEYING:

- A. LOCKS AND LATCHES:
- B. Locks: All locks shall be heavy-duty, ANSI A156.13 1000 Series certified for operational Grade 1 and Security Grade 2 and UL-labeled for use on fire doors up to and including three hours. All "Primary" locksets must be lever action and be able to accept small format I/C core 6 cylinders. All keys and cylinders shall be grade one high security. Primary locksets shall be keyed to Owner's specified keyway. All "Emergency" access locksets shall be "Best" lever handle to safeguard against accidental entry into unsafe areas such as mechanical, electrical, storage spaces etc. Provide locksets less manufacturer's cylinders. Contractor to provide and install all small format I/C cylinders, cores and keys that have been keyed to the Owner's specification. Use six-lobe Torx security screws with center pin at all exposed connections. Provide strike plates with curved face edges and metal strike boxes behind strike plates. Provide locksets from the following list:
 - 1. PRIMARY - INTERIOR LOCKSETS:
 - 2. Provide one of the following locksets for all interior doors (except doors to emergency access areas - Mechanical and Electrical Rooms).

SSI Guardian QAL Mortise Lock

Model - E

Function - M1

26D = Satin chrome finish

2.03 EMERGENCY ACCESS:

- A. Provide locksets as listed below for all mechanical, electrical rooms, computer and telephone wiring hubs, Boiler Room doors and all other maintenance related doors.

- B. **BEST 9K CYLINDRICAL LEVER LOCK**

9K = Heavy duty cylindrical lever lock

7 = 7 pin core

D = Storeroom function

14D = Curved lever handle with curved return

26D = Satin chrome finish

AL = Abrasive lever (not on front door)

- C. ALL EXTERIOR DOORS to have one 3-1/2" x 15" stainless steel pull plate with finger pull at the bottom of the plate, installed on the outside and exit devices on the inside.
1. Exceptions:
 - a. Provide one "primary" lockset with cylinder, core and AC keying in one of the main Entrance doors. Provide a primary lockset for one door of all main entrance lobbies to gymnasiums, auditoriums, etc.; where singular use of those spaces will be accessed during hours when the school is closed. **Locksets and keying is to be determined by the Owner in tandem with any applicable MNCPP requirements.**
 - b. Provide one "primary" lockset with cylinder, core and AC keying in the exterior door to the food service (kitchen) suite.
 - c. Provide one "emergency access" lockset with "Best" cylinder, core and keying at the exterior entrance to the boiler room.

2.04 REST ROOMS LOCKSETS: MORTISE DEADBOLTS

- A. Multi-Person Toilets (All Persons):

Push-Pull Plates: Ives No. 8302 3 1/2 x 15

Ives No. 8200 3 1/2 x 15

1. Deadbolt Above Latch: Classroom Function

Sargent No. 470

Schlage B Series

Corbin Russwin No. DL3100

- B. Single Person Toilets (All Persons):

1. All single person toilets will have a Bathroom function lockset installed with an emergency access cylinder. A secondary lockset with double cylinders and a thumbturn is necessary to provide privacy and security.

- a. Privacy Bathroom Lever Lockset: Bathroom Function

Sargent 11-Line

Schlage ND-Series

Corbin Russwin CL-3300 Series

- b. Deadbolt Above Lockset: Double Deadbolt Public Toilet Function

Sargent No. 470

Schlage B Series

Corbin Russwin No. DL3100

2.05 KEYING

- A. **General: Contractor's hardware supplier will meet with the Architect and Owner's representative to ensure that all hardware instructions are understood and to mark up two (2) sets of**

architectural floor plans to record the proposed keying assignments. Any deviation from the instructions in this Specification must be made during this meeting and approved in writing by the Owner.

- B. All newly constructed schools and all total renovations will have small format I/C cylinders to accept a 7 pin core installed into "primary" locksets. All keying will be set up on a three-submaster key system as outlined below (in Middle Schools and High Schools, **additional sub-masters may be added at the discretion of the Owner. No Grand Master keys are to be made or used.** The hardware supplier/installer will be notified of any additions at the Keyset meeting per #1 above.). Replace all existing lockset cylinders with small format I/C cylinders and cores and provide specified number of keys and new key cabinet(s).
- C. At existing schools where small additions or small renovations are being constructed, it will be necessary to match the existing keying system in all new doors and provide a key cabinet for the new keys.
- D. **AA Master Key:** Cleaning Master - Used to access **most interior spaces**. The following spaces are to be keyed to the "A-A" Master:
 - 1. All classrooms - All hall doors to a classroom (or common space) are to be keyed alike.
 - 2. Between Classrooms (Lockset in doors between adjoining classrooms to be double-keyed and keyed different. Cylinder in adjoining classroom keyed to adjoining classroom's corridor cylinder, this does not apply to shared: science prep rooms.)
 - 3. Multipurpose Room
 - 4. Library
 - 5. Main Office - Hall door(s) only (except as noted in Best Keying, B-7)
 - 6. All Administrative Offices (except Principal's Office)
 - 7. Health Room
 - 8. Gymnasium (except as noted in B-2)
 - 9. Toilet Rooms (single and multi-person)
 - 10. Kitchen Serving Line
 - 11. Kitchen Office
 - 12. Custodial Closets (Also see AC Keying B-6 & Best Keying B-7)
 - 13. Courtyards
- E. AB Master Key - Used to access large storage rooms. Used to access storage rooms and closets which contain low or medium value items. This key will access the Principal's closet; classroom closets and all other closets. Refer to AC for exceptions.
- F. AC Master Key - Used to access small storage rooms. Used to access storage rooms housing high value items located both inside and outside the building. Refer to Best for exceptions. Used to access the following:
 - 1. Front Door to Main Lobby
 - 2. A.V. Equipment from interior
 - 3. Science Prep Rooms
 - 4. Custodian Main Supply Room from interior
 - 5. Physical Education Equipment - Inside plus outside keyed differently
 - 6. Entrance to Kitchen from outside

7. Kitchen Food Storage Room from interior
 8. Outside Storage Rooms
 9. Music Storage
 10. School Storage
 11. Main Office Vault and Guidance Records Vault
 12. Health Room Medicine Storage Closet
 13. Principal's Office
- G. Best Keying System - Emergency access master. Used to open and lock-up the facility and for emergency access by maintenance crews after hours. Provide Best lockset with Best 7 pin core. See 2.2A-2. Used to access the following:
1. Boiler Room Interior Hall and Exterior Doors
 2. Security and Fire Alarm Rooms
 3. Electrical and Generator Rooms (with or without storage capacity)
 4. Padlocks for roof hatches, generator and air conditioning unit gates
 5. All Interior Corridors
 6. All Mechanical Rooms and Roof
 7. Telephone and Computer Wiring Hubs and P.A. Equipment Rooms
 8. Gate to Generator and Propane Compound
 9. Backflow preventers
 10. Main Entrance - see below*
 11. Main Office - see below*
 12. *One main entrance door is to be added to the Best keying section.
- H. one main office door, closest to the P.A. room will be added to the best keying section. in addition, one main office door, closet to the p.a room will be keyed with a best core and cylinder.
1. Note: No. 7 may not be applicable if the above rooms/spaces are not provided within small additions and/or classroom additions.
- I. Exterior doors shall NOT be keyed (no cylinders) on the exterior side, except as previously mentioned (Section 2.03 C-1), including the exterior kitchen entrance, exterior boiler room entrance, and the main front door entrance). All non-keyed doors to the exterior shall have code approved push bar hardware on the inside and vandal proof pull handles on exterior (except as noted in section 2.03 C-1).
- J. Equip all locksets with construction cores for temporary use during construction. Key construction cores as directed by the contractor. Hardware supplier to return all temporary construction cores to lockset manufacturer if requested or required by manufacturer.
- K. Permanent Keys and Cylinders. Pin all small format I/C cores and cut all keys at the factory only. Five change keys will be provided for each lockset supplied. Permanently emboss one side of the key bows with DO NOT DUPLICATE and the other side with the key control numbers (AA-1; AC-10; etc.). All permanent cylinder parts shall be stainless steel and nickel silver. All cylinders and keys are to be shipped directly to the Contractor, who is responsible for the security and installation of these items into the door locksets. Installation work will be performed by a certified locksmith. It will include the cylinder

installation per the Keyset information and inspection of the completed lockset and cylinder for proper function per the manufacture.

- L. **Permanent “Best” Keys and Cylinders.** Prior to acceptance of the building, the Contractor will pay for and arrange to have the Best Access Systems supply the Owner with the quantities of “Best” pinned cylinders and cut keys that will be needed to fulfill the requirements of Section 2.2 B-7. In addition, the Contractor will pay for and arrange to have the Best Access Systems supply the Owner with the quantities of “Best” pinned cylinders and cut keys over and above what is needed for Section 2.2 B-7 as stated below:

1. **Elementary Schools - 20 cylinders and 10 keys**
2. **Middle Schools - 30 cylinders and 15 keys**
3. **High Schools - 40 cylinders and 20 keys**

- M. These cylinders and keys shall be prepared in accordance with the Owner’s existing system. Instruct the Best Access Systems to ship this part of the hardware directly to the Owner’s locksmith at:

Prince George’s County Public Schools
Facilities Service Base
4801 Brown Station Road
Upper Marlboro, Maryland 20772
Attention: Carpentry Shop Locksmith

Indicate the project name on the package.

- N. The Owner’s locksmith will install the Best cylinders into the new locksets as indicated on the key meeting floor plan drawing. A construction core control key will be provided to the Owner’s locksmith by the Contractor.

The General Contractor must make the request for the installation of the Best system by calling 301-952-6500.

- O. **Key Management.** The Contractor will provide and install a complete key management and storage system to house all of the door keys, all of the built-in casework keys (all casework keys are to be mastered and keyed differently) and all of the mechanical equipment keys. The Contractor will organize, label, record and install all of the keys into the key cabinet(s) before delivery to the construction site. The Contractor must implement a key management system to manage all casework keys. Organize key cabinet(s) and cross-index by room numbers, codes, and hook. The Contractor is solely responsible for the security of the keys and the key cabinet(s) until the site is turned over to the Owner. He will record the final permanent room numbers, the architectural door number, the key hook number, the Keyset number and the key bitting in the cross-index loan register book. Provide three (3) complete hard copies of the register book and the bitting chart.

Provide a two collar key tag system: one red with “MUST NOT BE LOANED” with one key permanently attached and one white with the remaining four keys attached on a removable snap hook, both to have consecutive hook numbers stamped into them. No plastic tags will be accepted.

Provide two (2) sets of hook numbers: one for the red-tagged keys and one for the white-tagged keys. All door keys are to be tagged, with the final room number on one side and the hook number on the other side. Place the four (4) white-tagged keys on hooks in the upper section of the cabinet(s). Place the red-tagged keys on hooks in the lower section of the cabinets(s), leaving the last drawer(s) empty for lock and key storage.

Provide grade "A" type file drawer key cabinet(s) with individual drawer locks keyed different and mastered keyed (only three master keys to the cabinet are to be supplied and delivered to the Owner) with full extension drawers, standard base and all necessary components. Provide removable slide-out panels with single row numbering and key hooks. Provide products from the following list:

	<u>Elementary</u>	<u>Middle</u>	<u>High</u> Provide
	Provide one	Provide one	two Cab. No.
	Cab. No.	Cab. No.	
Key Control Systems:	6L2205	8L3003	8L3003
Telkee Inc.:			
Lund Inc.:			

- P. Mobile key cabinet Security: The grade "A" type file cabinet(s) for keys must be mobile and a permanent anchoring system for the cabinet is to be established in the main office vault. A permanent masonry wall or floor mounted anchor capable of accepting a length of 5/0 chain must be incorporated into the construction of the vault. The anchor must be located near the vault entrance while still maintaining unimpeded access to the vault. The mobile key cabinet must have a similar hard point welded or otherwise permanently attached to the rear of the cabinet that will accept a section of 5/0 chain. The wall/floor mount and the cabinet mount must withstand a pulling force of 500 PSI. At the time of delivery of the cabinet to the building, the Contractor will schedule a meeting with the Owner to secure the cabinet in the vault. The Owner's will supply the padlock to secure the chain to the wall and cabinet. At this meeting the Contractor will hand deliver the cabinet's master keys to the Owner.
- Q. Key Control for Additions and Renovations. Key control shall be provided for additions and renovations of 15 classrooms or less by supplying a complete key storage and management system. Five factory cut "change" keys will be provided for each lockset. Each key shall be fully indexed, tagged and installed on cabinet hooks before the cabinet is delivered to the building by the Contractor and installed in the building as directed by the Owner. The cabinet shall be a heavy-duty metal wall mounted box with a capacity of 200% over the number of locksets and cabinet/casework keys. The key box is to be mounted in the main office vault by the Contractor only. Provide a 3-way cross index system referencing the permanent room number, key symbol and bitting number set up by key control manufacturer and place keys on markers and hooks in the cabinet as determined by the final key schedule. Provide one red tag for each key and mark as "DO NOT REMOVE." Attach red tag to one of the five keys and place it first in the essential cabinet. The remaining four keys will then be placed on the white clip tags and placed on the same numbered hook. No plastic tags will be accepted. Provide three copies of the key chart showing hook number, keyset number, and location of the room the key opens, the key bittings and three bitting charts. Two charts are to be a permanent part of the key cabinet. Turn over the other key chart and the three bitting charts to the Owner (telephone 301-952-7834). A set of marked blueprints will also be provided showing door numbers and keysets to be placed in the keybox. Provide the key cabinet from one of the following: Key Control Systems, Inc. or Telkee, Inc. This policy will apply to all keying of small additions and/or renovations.
- R. Acceptance of the Building and Permanent Keys. The Contractor shall deliver all remaining contract hardware items to the school no later than ten (10) working days before the General Contractor makes his request to activate the Owner's security system (No. 11 above). All of the following items must be complete before the security system can be turned on.
1. All doors and hardware items delivered and installed.
 2. Key cabinets(s) set up, delivered and installed.
 3. All contract keys correctly arranged and filed in cabinet(s).
 4. All "Best" keys and cylinders delivered to Owner's locksmith.

5. All keys, cylinders, tools, equipment and supplies have been delivered to the school and securely stored in the key cabinet(s). In addition to the scheduled door hardware, provide the following items:
 - a. 5 "change" keys for each door lockset.
 - b. Following number of master key sets, AA, AB, AC, per school to be provided - 10 for Elementary Schools, 20 for Middle Schools and 30 for High Schools (any keys for additional master sub-sets will also be provided as required per Section 2.2 B-2).
 - c. 100 extra key blanks.
 - d. 3 Factory Bitting Charts.
 - e. 3 Key Loan Register books, correctly filled in.
 - f. 3 copies of architectural floor plans showing door numbers, permanent room names, room numbers and keyset information.
 - g. 3 copies of all service manuals with complete parts catalogs listing part numbers and pictures of all parts for all locks provided. .
 - h. All control keys.
 - i. 6 copies of a transmittal letter listing the above-items and received by space.
 - j. Specified number of key cabinets - See No. 12 above.
6. Replace all construction cores or cylinders with specified permanent cylinders as directed elsewhere.
7. General Contractor shall arrange a meeting at the school with the hardware contractor, Architect and Owner when all of the above items are ready for acceptance by calling the Department of Planning and Architectural Services at (301) 952-6548. Request a final hardware inspection and acceptance meeting.

2.06 PUSH/PULL PLATES:

- A. Push Plates: Provide push plates on all interior doors. Push plates shall be stainless steel with 4 beveled edges. Plates shall be 1/8" x 3-1/2" x 15" and be cut for cylinder or thumb turn as needed. Provide products from the following list:
 1. Lindstrom 110
 2. Hiawatha, Inc. 200D
 3. Rockwood 70
 4. Trimco 1807-4
- B. Pull Plates: Where identified on the hardware schedule, provide pull plates on exterior side of exterior doors. Pull plates shall be stainless steel with four beveled edges, be 1/8" x 3-1/2" x 15" and cut for cylinder as needed. Provide products from the following list:

Exterior Doors:

1. Lindstrom 110VA
2. Hiawatha 1456
3. Rockwood 91
4. Trimco 1820

Interior door pulls will be as described in lockset and exit device specifications listed in Sections 2.2 and 2.4.

2.07 EXIT DEVICES:

- A. All code approved exit devices are to be grade one touch-bar type and made of stainless steel construction. Devices shall have rim actuated, single point latching, that is preferred at all locations. Vertical rod, two-point latching, is not preferred for maintenance reasons and shall be avoided wherever possible, Provide pull plates on the exterior side (see 2.3B).
1. Provide products from the following approved list of manufacturers:
Exterior Doors
Von Duprin 98
Sargent 80 Series
Corbin Russwin ED 5000s
Interior Doors
Von Duprin 994L-17
Sargent 80 Series
Corbin Russwin PR 955
- B. Classroom Trim. Provide exit device hardware on classroom exterior doors.
- C. Attachments: All devices are to be supplied and installed with sleeve nuts and machine bolts. Devices are to be through-bolted to the escutcheon trim for added strength and security.
- D. Finish: All devices and trim shall be 32D, Satin Stainless Steel - or Architect approved manufacturer's standard "mostly stainless steel product" listed above.
- E. Strike: Provide manufacturer's standard curved face strike or as detailed in the hardware sets. All strike plates must have curved face. Provide metal keeper boxes behind all striker plates.
- F. Removable Mullions: Provide Hex Key operated removable mullions at all double doors. Provide weather-stripping on all exterior doors mullions. All mullions to be steel only. Aluminum will not be accepted. Use UL rated mullions where required. All mullions to be furnished with mullion stabilizers. Provide products from the following list:
Sargent 12-L980
Von Duprin #KR9954
Corbin/Russwin #KRM 710
- G. Latching Devices:
1. Provide single point latching on interior and exterior single doors and double doors with removable mullions, wherever possible and allowed by code.
 2. Provide two point latching with surface-mounted vertical rods on pairs of interior doors, only, where removable mullions are not permitted by code or conditions warrant. Do not provide vertical rod latching on any exterior door assembly.
 3. Where vertical rods are warranted, provide vertical rod and latch guard protection over all (above and below) surface-mounted vertical rods. Guards to cover full height of all exposed rods and latching devices. See 2.10 E for approved list.
- H. Coordinators: Avoid the use of automatic coordinating device for sequential closing of paired doors to prevent active leaf from closing ahead of inactive leaf. Where automatic flush bolts or self-latching flush bolts must be installed, use one of the following:
Approved List

600 Series

H. B. Ives 900 Series

Glynn-Johnson COR Series

- I. Intumescent meeting styles protection is approved where conditions exclude the installation of the above-specified hardware.

Approved List

Zero #328FSA

#328FSD

- J. Dust Proof Strikes: Provide dust proof strikes with each bottom surface bolt.

Rockwood 572

2.08 SURFACE BOLTS

As codes and conditions permit, provide surface bolts on the inactive door of pairs at top and bottom of the doors. Provide all necessary strikes, shims and guides to insure proper installation. All bolts shall be zinc-plated or dull chrome finish. Provide surface bolts on top section of dutch doors. Do not use automatic or self-latching flush bolts and do not use mortised type extension flush bolts. Use only surface applied bolts.

Approved List

DCI #780F

H. B. Ives #458

Glynn Johnson Corp., #FB6

Lindstrom Corp. #265

Rockwood #580

2.09 SURFACE CLOSERS:

Provide closers on all interior and exterior doors except on connecting rooms within administration suits.

1. All surface closers shall meet grade 1 or the highest level of cycle test requirements of the applicable ANSI standards. Closers shall be fully hydraulic, rack and pinion action, be constructed of hardened, high-strength cast aluminum or cast iron shell. Cylinders shall be one piece forged steel piston with a minimum diameter of 1 1/16". Hydraulic fluid shall be non-gumming, non-freezing and not necessitate seasonal adjustments for temperatures from 120° F to -30° F. Provide hydraulic regulation controlled by temper-proof, non-critical screw valves, adjustable with a hex wrench to independently regulate backcheck cushioning and backcheck positions. Provide multi-size spring power adjustment to permit setting of power from 2 - 6. Include high efficiency, low friction pinion bearings. Closers to have delayed action and be designed to resist vandalism and tampering. Closers to be a combination closer/shock absorber stop.
2. Provide heavy-duty, non-adjustable arms with built-in heavy-duty spring to smoothly decelerate door to a stop. Provide the manufacturer's heaviest/high security arm.
3. All closers are to be supplied and installed with sleeve nuts, Torx screws and machine bolts. Through bolt and use Torx fasteners with center pins at all exposed connections.
4. Provide heavy-duty gauge full metal covers with a minimum of 2 Torx mounting screws. Covers to have closed tops and bottoms. All closer adjustments shall be shielded by the cover. Provide a powder coat painted aluminum finish.

5. Options: As dictated by codes or indicated in the drawings or hardware sets, provide arm and feature options such as adjustable delayed action, barrier free, positive stop and/or hold open arms, low profile arms, and special mounting brackets and plates. Furnish barrier free closers on all interior doors that are not UL listed.
6. All closers and accessories shall be the top of the line and carry a manufacturer's ten- year warranty against workmanship and materials.
7. Provide hold-open models on closers for all exterior doors.
8. Provide support plates for all doors to protect the wood veneer from being crushed by the through door closer fasteners. Locate the plates so one plate supports all of the surface closer fasteners. The plates shall be 1" larger in all directions than the layout of the fastener pattern and made from .050 thick stainless steel, holes to be shop-drilled and countersunk.

Provide closers from the following list:

SARGENT: 350 - MC / 351 - MC SERIES

SARGENT: 9 - 2477 x 24VDC

NORTON: UNI 7500M - AL

NORTON: UNI 7500MBF - AL

L.C.N.: 4040 - 3077SC or 3049SC

L.C.N.: 4041 - 3077SC or 3049SC

Corbin Russwin: DC2200 x A11 (or A12)

2.10 FLOOR CLOSERS AND PIVOTS

- A. Provide floor closers and pivots on doors only as required by the architect in hardware schedule.
- B. Floor closers shall be cast iron with a spring power adjustable helical spring which rotates and does not move from side to side. Closers shall have separate and independent valves for adjusting closing speed, latch speed, backcheck, hold-open, and delayed action features.
- C. Floor closers shall have permanent, non-removable spindles to assure security and total door control.
- D. Floor closers shall have a built-in dead stop and shall be installed with intermediate pivots to provide complete door control and a top and bottom simultaneous cushion and dead stop. The pivots and stops are to be supplied by the floor closer manufacturer to assure proper templating and door coordination. In addition, stops must prevent wall or door impacts to door hardware or locksets. Coordinate with Section 2.8 if necessary.
- E. Provide floor closers with cold weather fluid, sealed closer feature, rust proof cycolac cement case, threshold and other options as indicated in the drawings or hardware sets.

Approved Manufacturer:

1. Rixon PHQ27-S-105 floor closer, Rixon M19-Pivot.

2.11 DOOR STOPS:

- A. Floor Stops: Floor stops are to be the primary door stops, every door leaf is to have either a floor, wall or overhead stop and/or a combination of stops that will prevent the locksets, hardware or door(s) from impacting with walls, cabinets or other objects. Install floor stops on floor surface, vertically plumb, below the center of the door lockset.

Furnish from the following list:

Glynn-Johnson #FB 18S

Rockwood #463

Trimco #1209

- B. Wall Stops: Supply wall stops only in such situations where a floor stop cannot be installed, one 3" down from the top of the door and one 3" up from the bottom of the door. An overhead stop may be required in addition to any other specified wall hardware. Wall stops (and/or overhead stops) must prevent a lockset, door hardware or exit device from impacting a wall or other hazard. Walls consisting of open frame and drywall must be re-enforced behind wall stops to prevent wall damage. Supply US26D or US32D finish. Furnish from the following list:

Glynn-Johnson #WB 11X

IVES #443

Hiawatha #1320 E

Rockwood #475

Trimco #1296

- C. Overhead Stops: Provide heavy-duty surface-mounted (only) overhead stops where required to prevent doors and/or closer covers from being damaged by coming in contact with cabinetry, corners of walls, etc. All stops will have a no hold-open feature, unless specified elsewhere. Stops shall incorporate a heavy-duty channel and slide arm and offset jamb brackets have tempered steel shock absorber springs that provide 5° - 7° compression before coming to a dead stop. There shall be a nylatron slide block and shock block, designed for high traffic, heavy abuse installations on interior and exterior doors. They shall be non-handed, steel channel arm and bracket, surface mounted, single action, stainless steel.

Provide products from the following list:

Rixson: H.D. 9 Series

Glynn-Johnson: 90 Series

Sargent: 590 or 1540 Series - Non-Friction Type

2.12 ELECTROMAGNET HOLDERS:

- A. Electromagnet Holders: All fire labeled cross corridor, multipurpose room, auditorium and stair tower doors shall be held open by narrow projection wall mounted electro-magnet door holders, surface closers and ceiling mounted smoke detectors. The wall magnets shall have concealed wiring and through-bolted armature. Magnet holding power shall be 300 pounds and be protected against transients and surges up to 600 volts. Magnets shall be fail-safe with a positive release button to initiate a closing motion when released by a smoke detector or fire alarm. Furnish from the following list:

Rixson 2-FM993 x 2-9734 - AL

- B. NOTE: Securely anchor all electrical boxes to walls with heavy-duty toggle bolts capable of providing a horizontal holding power of 500 pounds of pressure. No plastic anchors will be accepted.

1. Special Openings: Where fire labeled cross corridor openings are fully recessed in a wall pocket, furnish from the following list:

- C. Pocket Hinges

1. 6 each Rixson #519
2. 6 each McKinney PH3

- D. Wall Magnets

1. 2 each Rixson FM993 Series

- E. Smoke Detectors
 - 1. 2 each Rixson #9734
- F. Floor Closers
 - 1. 2 each Rixson #50 Series
 - 2. By special layout #2790
- G. Vertical Rod Fire Exit Devices
 - 1. 2 each Corbin/Ruswin ED5400A -M55 x M910 x 630
 - 2. 2 each Sargent 8715-LBR-ETP
 - 3. 2 each Von Duprin 9827F-LBR x 994L-BE x 630
 - 4. 2 each Yale 7110F-LBR x AU628F x 630

2.13 PROTECTIVE PLATES:

- A. Kick and Mop Plates: Provide two kick plates on all interior doors 10" by 1" less than door width. Plates shall be .050 stainless steel and beveled on four sides. All plates shall be prepared for and furnished with stainless steel sheet metal screws.
 - 1. Install on both sides of door
 - 2. 10" high
 - 3. 1" LDW (less than door width) at paired openings and 1 ½" LDW at single doors.
 - 4. Mount plates 1/8" from the bottom of the door.
- B. Stretcher Plates: All stretcher plates shall be 6" by 1" less than door width. Plates shall be .050 stainless steel and beveled on three sides.
 - 1. Install on push side of door
 - 2. 6" high
 - 3. 1" LDW (less than door width) at paired openings and 1 ½" LDW at single doors.
 - 4. Install at height to best protect doors from cart damage. Consult with Owner to confirm required height.
 - 5. Bevel edges at top, bottom and sides.
- C. Armor Plates: Armor plates shall be 30" by 1" less than door width. On labeled doors, the armor plates shall be a maximum of 16" in height. Plates shall be .050 stainless steel and beveled on three sides. Provide for hardware cutouts as needed. Locations where armor plates are required; A.V. storage, loading docks and any doors where carts will be used.
 - 1. Install on push side of door
 - 2. 30" high, 16" high on labeled doors
 - 3. 1" LDW (less than door width) at paired openings and 1 ½" LDW at single doors.
 - 4. Mount plates 1/8" from bottom of door.
 - 5. Provide hardware cutouts as necessary.
- D. Lock Guards: Provide lock guards on doors to gymnasiums, multipurpose rooms, food service, art/shop classrooms, exercise rooms, weight lifting rooms, all storage rooms and the three keyed exterior doors.
 - 1. Heavy gauge, satin finished stainless steel.

2. Offset design to permit clearance for lip of lock strike.
3. Through-bolted with concealed fasteners.
4. Do not provide alignment pins that penetrate the hollow metal doorframe.

Acceptable products for A, B, C and D are:

- a. Ives 180
 - b. Ives 8400 Series
 - c. Glynn-Johnson LP10 or LP11
 - d. Rockwood
 - e. Trimco
- E. Vertical Rod Covers and Latch Guards: Provide vertical rod covers from .050 stainless steel that completely fills the space between the latch guards and the exit device's lock stile covers. Provide latch guards from .062 stainless steel, 10" high at the top and bottom exit device's latches. Provide products from the following list:
1. Rockwood #BFRC + BFLG
 2. Von Duprin #RF-27
- F. Edge Guards: Provide edge guards on all wood doors to storage rooms. Provide products from the following list:
1. Rockwood #306B
 2. Hiawatha #DES-5C

2.14 THRESHOLDS:

- A. Supply thresholds as indicated in the drawings or in the hardware sets. All thresholds shall conform to state and local building and handicap codes. Set all exterior thresholds in a full bed of joint sealant. Thresholds for floor closers shall be supplied by the floor closer manufacturer. Provide products from the following list:
1. National Guard Product No. 896 or No. 950
 2. Pemko No. 2005 or No. 2001
 3. Reese No. S483 or No. S256
 4. Zero No. 566 or No. 565

2.15 WEATHER-STRIPPING, GASKETING AND SILENCERS:

- A. All exterior openings shall be provided with tight fitting weather stripping with UL labeled gasketing. Apply gasketing to head, hinge jamb, and lock jamb. For other applications, refer to drawings and hardware sets.
1. Pemko 315 DR
 2. N/G 130 NDKB
 3. Reese 373 SSD
- B. Door Sweeps: Provide tight fitting door sweeps on the outside of all exterior doors, all kitchen doors and as indicated in the drawings and hardware sets. Supply from the following list:
1. National Guard Products E609 DKB
 2. Pemko 18100 DP

3. Reese 965 D
 4. Zero 96 A
- C. Door Bottoms: Provide tight fitting automatic door seal, mounted on the inside bottom of all exterior doors.
1. National Guard Products 320N
 2. Pemko 420AS
 3. Ultra DB044
- D. Astragels:
- Weather-stripping Astragels: Provide tight fitting split astragel meeting stile on exterior sides of all exterior doors. Overlap ends of weather-stripping. Provide products from the following list:
- Pemko 18041 DP
1. National Guard 600 DKB
 2. Reese 967 D
 3. Zero 98 D
- E. Silencers: Provide silencers for all hollow metal frames, three at each single door and at each pair of doors. Not required to be listed in hardware schedule, but all door frames are required to have specified number of silencers. Provide 30 extra silencers to owner for replacements. Provide products from the following list:
1. Rockwood 608
 2. Glenn Johnson GJ64
 3. Ives 20
- F. Sound Proofing: As approved by architect.

2.16 FASTENERS:

- A. Fasteners shall be suitable size, quantity and of the same material and finishes as the hardware being secured. All fasteners exposed to weather shall be corrosion-resisting steel. Use Torx head screws/bolts with center pin when possible.
1. Machine screws and tamper shields shall be furnished for attaching hardware to concrete, stone or masonry.
 2. Machine or sheetmetal screws shall be furnished for attaching hardware to metal.
 3. Self-tapping screws shall be furnished for attaching kickplates to mineral core doors and continuous hinges to steel frames.
 4. Full thread screws shall be furnished for attaching butt hinges to wood core doors.
 5. Sleeve nuts and machine bolts (sex bolts) shall be provided for attaching surface type closers or closer arm and interior pull handles to wood doors, all exit devices, and O.H. holders.
 6. Use only machine screw expansion shields when fastening into masonry. Do not use plastic anchors.
 7. Use six-lobe Torx security screws with center pin at all exposed connections in all locksets.

PART 3 - EXECUTION

3.01 PRODUCT HANDLING

- A. Contractor shall provide adequate locked storage space with shelving and be responsible for scheduled quantities of hardware when delivered to the job, and payment of invoices covering such material, when and as delivered.
- B. Tag each item or package separately, with identification related to hardware set number and door number.
- C. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged and properly tagged finish hardware at the proper time and location to avoid any delays in construction or installation.
- E. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

3.02 HARDWARE INSTALLATION:

- A. General: Prior to installing any hardware or locksets, the architect shall arrange a meeting with the general contractor, the hardware/door/frame supplier, the owner, the lockset manufacturer's representatives and the hardware installer to review installers' qualifications, installation, any special requirements, etc. Installer must have five years minimum comparable experience in commercial/institutional hardware installations. Contractor must provide an ASSA certified locksmith to install ASSA cylinders and inspect for proper function of locksets. Install each hardware item in compliance with manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, reinstall each item. Do not install surface mounted items until finishes and painting have been completed. Protect hardware from damage until Final Acceptance.
- B. Hardware mounting heights shall comply with DHI or MAMNI "Recommended Locations for Builders Hardware" or as scheduled. If no locations are indicated on the drawings, the following location can be used to install the hardware. The contractor is fully responsible for coordinating the entire installation.
 - Center of Door Lever: 38" above finished floor, A.F.F. (36" elementary schools)
 - Center of Cylinder Deadlocks: 48" above finished floor
 - Center of Panic Bars: 36" A.F.F.
 - Center of Push Plates: 45" A.F.F. (35" elementary schools)
 - Upper Edge of Top Hinge: 5" below door head
 - Lower Edge of Bottom Hinge: 10" A.F.F.
 - Center Hinge: Midway between top and bottom hinge
 - Floor Stops: Plumb from center of lockset
- C. Adjust and check each operating item of hardware and each door to ensure proper operation of functions of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite-type if no other is recommended). Replace units which cannot be adjusted, per manufacturer's instructions and lubricate to operate freely and smoothly as intended for the application made. 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.
- D. Thresholds shall be full width of openings, notch at stops and center mullions, etc., as required, and set in full bed or butyl rubber or polyisobutylene mastic sealant or in accordance with manufacturer's

instructions such as to prevent seepage of water or vapor.

- E. Installation by Other Trades: All electrical equipment is to be coordinated with responsible trade, with proper wire and wiring furnished and connections made under that section per NFPA & NEC.
- F. Final Adjustment: Wherever hardware installation is made more than two weeks prior to final acceptance of the building for occupancy, the contractor and hardware installer shall make a final check and adjustment of all hardware items. Clean and relubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment. Replace all defective damaged, missing or stolen hardware.
- G. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- H. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- I. Clean adjacent surfaces soiled by hardware installation.

3.03 MATERIALS AND WORKMANSHIP:

- A. Provide all hardware, unless otherwise specified, of the best grade, entirely free of imperfections in manufacturer and finish and guaranteed by the manufacturer to satisfactorily perform the various functions required of it for a long life under normal usage but for a period not less than five years from the date of acceptance. Metal finishes will be as specified.

B. Defective Work:

Hardware found defective in materials, fabrication, coordination or installation upon acceptance of the building will be replaced, reworked or otherwise made good as required to the Owner's specifications at the contractors expense. All replacements and repairs to be completed before the six month inspection as in item (3.3.C) below.

The following shall also be considered as defective or unacceptable materials (But not limited to):

- 1. Unauthorized substitutes.
 - 2. Items delivered with missing, broken, damaged or defective parts.
 - 3. Items of incorrect hand or function.
 - 4. Improper installation.
- C. Six-Month Reinspection: Approximately six months after the final acceptance of the building, the Contractor and the qualified ASSA certified locksmith representatives from the installer shall return to the project to test, adjust, tighten and/or replace all hardware items required to ensure the proper function and to determine that all hardware punch-list items have been corrected. The Contractor shall replace all items that have failed due to faulty manufacturing, faulty design, poor quality materials and/or improper installation or coordination at no cost to the Owner. After the Contractor is completely satisfied that all hardware items are installed and functioning as intended for its application, he/she shall arrange a meeting with the Owner, ASSA technical personnel, the architect, the installer, the supplier and the lockset manufacturer. A walk-through of the building shall be made to ensure that all hardware items have been installed and functioning correctly.

3.04 PART 4 - HARDWARE SCHEDULE

- A. Provide one complete hardware set with appurtenances for each opening, as indicated on the door and frame schedule, and the hardware schedule. All product selections shall only be made from the contract documents without exception.

B. HARDWARE SCHEDULE: PREPARE HARDWARE SET FOR EACH TYPE OF PROJECT APPLICATION

HARDWARE SET NO. 1 SAMPLE

CLASSROOM DOOR FROM CORRIDOR

EACH LIKE DOOR TO HAVE:

FULL MORTISE HINGES 4 1/2X4 1/2X.097 2.1

PRIMARY LOCKSETS-CLASSROOM FUNCTION 2.2

SURFACE CLOSER

WALL/FLOOR STOPS 2.8

KICK PLATES 2.10

SILENCERS 2.12

3.05 LIMITATION OF HARDWARE SCHEDULE:

Schedule is furnished for whatever assistance it may afford the contractor; do not consider it as entirely inclusive. Examine drawings, specifications; determine extent, hardware, quality required. Should any particular door or items be omitted in any schedule hardware group, provide such door or item with hardware, same as required for similar purposes. The contractor is responsible for complying with all regulatory requirements, management of the means, methods, sequencing, coordination and providing complete assemblies for all hardware items.

END OF SECTION 08710

HARDWARE SETS**SET #1 - ACS ADA EXTER PR AL**

Doors: XA14, XA10

1	Continuous Hinge	661HD UL X LAR	AL	ST
1	Continuous Hinge	661HD UL X LAR EPT Prep	AL	ST
1	Power Transfer	EPT-12C		PR
1	Removable Mullion	822	689	PR
1	Exit Device	2103	630	PR
1	Exit Device	C MLR 2103	630	PR
2	Anti-Vandal Pull	1097 PHI 21 P C S3	630	TR
2	Rim Cylinder	12E-72 STD	626	BE
1	Electromagnetic Closer	TS9315 EMF/PT 120VAC	689	DM
1	Automatic Operator	BY SECTION 08 7113	689	BY
1	Actuators	BY SECTION 08 7113	630	BY
2	Kick Plate	K0050 10" x 35" CSK	630	TR
2	Door Stop	1209	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1	Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA
2	Door Position Switch	MC-4		DM
1	Card Reader	BY OWNER'S SECURITY INTEGRATOR		BY
1	Power Supply	RPSMLR2		PR

NOTE: COORDINATION WITH ELECTRICAL AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally closed, latched and secure. When locked momentary access by presenting valid credential to reader, by remote release or by mechanical key override. Exit devices can be mechanically dogged down with hex key providing push-pull operation. Doors can be electrically held open and remotely released. ADA operator will work in conjunction with MLR exit device. With loss of power doors will close if they were open and be locked unless they were mechanically dogged. Immediate free egress at all times.

SET #2 - ACS EXTER PR AL 6070

Doors: XC01, XD03, XD04, XB12, XB13

1	Continuous Hinge	661HD UL X LAR	AL	ST
1	Continuous Hinge	661HD UL X LAR EPT Prep	AL	ST
1	Power Transfer	EPT-12C		PR
1	Removable Mullion	822	689	PR
1	Exit Device	2103	630	PR
1	Exit Device	C MLR 2103	630	PR
2	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
2	Closer (Push Side)	TS9315 SPT CS LSN	689	DM
2	Kick Plate	K0050 10" x 35" CSK	630	TR
2	Door Stop	1209	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1	Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA
2	Door Position Switch	MC-4		DM
1	Card Reader	BY OWNER'S SECURITY INTEGRATOR		BY
1	Power Supply	RPSMLR2		PR

NOTE: COORDINATION WITH ELECTRICAL AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally closed, latched and secure. When locked momentary access by presenting valid credential to reader, by remote release or by mechanical key override. Exit devices can be mechanically dogged down with hex key providing push-pull operation. With loss of power doors will remain locked unless they were mechanically dogged. Immediate free egress at all times.

SET #3 - ACS EHO PR CROSS CORR +STAIR UL 1-2-5-22

Doors: D2

1	Continuous Hinge	662HD UL X LAR	AL	ST
1	Continuous Hinge	662HD UL X LAR X EPT Prep	AL	ST
1	Power Transfer	EPT-12C		PR
1	Removable Mullion	FL822	600	PR
1	Fire Exit Device	FL 2108 X V4908A	630	PR
1	Fire Exit Device	C FL E2103 X V4908A	630	PR
2	Rim Cylinder	12E-72 STD	626	BE
2	Magnetic Holder	EM 505-24120	689	DM
2	Closer (Pull Side)	TS9315 T LSN	689	DM
2	Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
2	Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
2	Gasketing	5050 B Head & Jambs		NA
1	Card Reader	BY OWNER'S SECURITY INTEGRATOR		BY
1	Power Supply	PS161-6		PR

NOTE: COORDINATION WITH ELECTRICAL, SECURITY AND FIRE ALARM SYSTEM REQUIRED.

OPERATION DESCRIPTION: Doors normally held open with electromagnetic holders. With activation of Fire Alarm System magnets will release allowing doors to close and latch. Outside lever trim can be locked or unlocked by mechanical key. When closed and locked momentary access through active leaf by presenting valid credential to reader or by mechanical key. Immediate free egress at all times.

SET #4 - ACS PR AL ADA VESTIBULE

Doors: A10C

1	Continuous Hinge	661HD UL X LAR	AL	ST
1	Continuous Hinge	661HD UL X LAR EPT Prep	AL	ST
1	Power Transfer	EPT-12C		PR
1	Removable Mullion	822	689	PR
1	Exit Device	2103	630	PR
1	Exit Device	C MLR 2103	630	PR
2	Anti-Vandal Pull	1097 PHI 21 P C S3	630	TR
2	Rim Cylinder	12E-72 STD	626	BE
1	Electromagnetic Closer	TS9315 EMF/PT 120VAC	689	DM
1	Automatic Operator	BY SECTION 08 7113	689	BY
1	Actuators	BY SECTION 08 7113	630	BY
4	Kick Plate	K0050 10" x 35" CSK	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
2	Door Position Switch	MC-4		DM
1	Card Reader	BY OWNER'S SECURITY INTEGRATOR		BY
1	Power Supply	RPSMLR2		PR

NOTE: COORDINATION WITH ELECTRICAL, SECURITY AND FIRE ALARM SYSTEM REQUIRED.

OPERATION DESCRIPTION: Doors normally closed, latched and secure. When locked momentary access by presenting valid credential to reader, by remote release or by mechanical key override. Exit devices can be mechanically dogged down with hex key providing push-pull operation. Doors can be electrically held open and remotely released. ADA operator will work in conjunction with MLR exit device. With loss of power doors will close if they were open and be locked unless they were mechanically dogged. Immediate free egress at all times.

SET #5 - ACS PR TDEU + CL 180 DEG HO

Doors: B115

1	Continuous Hinge	662HD UL X LAR	AL	ST
1	Continuous Hinge	662HD UL X LAR X EPT Prep	AL	ST
1	Power Transfer	EPT-12C		PR
1	Surface Bolt	3923-24"	626	TR
1	Surface Bolt	3923-12"	626	TR
1	Electro-mech Lock	45HW-7TDEU15H STD 24V 7/8"LTC C RQE	626	BE
2	Closer w/ HO (Pull Side)	8916 FH DA FC SL	689	DM
		NOTE: Install to obtain 180 degree opening		
2	Edge Guard	KE36-1 30"	630	TR
4	Armor Plate	KA050 30" x 34 1/2" CSK-AP	630	TR
2	Door Stop	1209	630	TR
1	Gasketing - Head	130 NA 72"		NA
2	Gasketing - Jambs	130 NA X LAR		NA
1	Astragal	BY DOOR MFG		BY
2	Door Sweep	D608A X LAR		NA
2	Door Position Switch	MC-4		DM
1	Card Reader	BY OWNER'S SECURITY INTEGRATOR		BY
1	Power Supply	PS161-6		PR

NOTE: COORDINATION WITH ELECTRICAL AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally closed, latched and secure. When locked momentary access by presenting valid credential to reader or by mechanical key override. With loss of power door will remain locked. Immediate free egress at all times.

SET #6 - ACS AL 3070

Doors: A101A

1	Continuous Hinge	661HD UL X LAR EPT Prep	AL	ST
1	Power Transfer	EPT-12C		PR
1	Exit Device	C MLR 2103	630	PR
1	Anti-Vandal Pull	1097 PHI 21 P C S3	630	TR
1	Rim Cylinder	12E-72 STD	626	BE
1	Automatic Operator	BY SECTION 08 7113	689	BY
1	Actuators	BY SECTION 08 7113	630	BY
2	Kick Plate	K0050 10" x 35" CSK	630	TR
1	Door Stop	1209	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1	Door Position Switch	MC-4		DM
1	Card Reader	BY OWNER'S SECURITY INTEGRATOR		BY
0	Power Supply	RPSMLR2		PR

NOTE: Use Power Supply with Door XA10

NOTE: COORDINATION WITH ELECTRICAL AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally closed, latched and secure. When locked momentary access by presenting valid credential to reader or by mechanical key override. ADA operator will work in conjunction with MLR exit device. With loss of power door will remain locked. Immediate free egress at all times.

SET #6A - ACS EXTER SGL HMD

Doors: XB14

1	Continuous Hinge	662HD UL X LAR X EPT Prep	AL	ST
1	Power Transfer	EPT-12C		PR
1	Exit Device	C MLR 2103	630	PR
1	Anti-Vandal Pull	1097 PHI 21 P C S3	630	TR
1	Rim Cylinder	12E-72 STD	626	BE
1	Closer w/ HO (Push Side)	8916 DST FC SL	689	DM
1	Edge Guard	KE36-1 30"	630	TR
2	Armor Plate	KA050 30" x 34 1/2" CSK-AP	630	TR
1	Door Stop	1209	630	TR
1	Gasketing - Head	700 NA X LAR		NA
2	Gasketing - Jambs	130 NA X LAR		NA
1	Door Sweep	D608A X LAR		NA
1	Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA
1	Door Position Switch	MC-4		SDCO
1	Card Reader	BY OWNER'S SECURITY INTEGRATOR		BY
1	Power Supply	RPSMLR2		PR

NOTE: COORDINATION WITH ELECTRICAL AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally closed, latched and secure. When locked momentary access by presenting valid credential to reader or by mechanical key override. With loss of power door will remain locked. Immediate free egress at all times.

SET #7 - SMOKE EVAC EXTER PR AL W/CYL

Doors: XD05A, XD07A, XD02

2	Continuous Hinge	661HD UL X LAR EPT Prep	AL	ST
2	Power Transfer	EPT-12C		PR
1	Removable Mullion	822	689	PR
2	Exit Device	C MLR 2103	630	PR
1	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
1	Anti-Vandal Pull	1097 PHI 21 P C S3	630	TR
1	Rim Cylinder	12E-72 STD	626	BE
2	Automatic Operator	BY SECTION 08 7113	689	BY
2	Kick Plate	K0050 10" x 35" CSK	630	TR
2	Door Stop	1209	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1	Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA
2	Door Position Switch	MC-4		DM
1	Power Supply	RPSMLR2		PR

NOTE: COORDINATION WITH ELECTRICAL, FIRE ALARM/ SMOKE EVAC SYSTEMS AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally closed, latched and secure. With activation of Smoke Evacuation System MLR exit device latches will retract allowing automatic operators to open doors. Exit devices can be electromechanically providing push-pull operation. One door leaf has been provided with key access. With loss of power doors will be closed and latched. Immediate free egress at all times.

SET #8 - SMOKE EVAC EXTER PR AL

Doors: XD05C, XD05D, XD07B, XD07C, XD07D, XD01, XD05B

2	Continuous Hinge	661HD UL X LAR EPT Prep	AL	ST
2	Power Transfer	EPT-12C		PR
1	Removable Mullion	822	689	PR
2	Exit Device	C MLR 2103	630	PR
2	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
2	Automatic Operator	BY SECTION 08 7113	689	BY
2	Kick Plate	K0050 10" x 35" CSK	630	TR
2	Door Stop	1209	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1	Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA
2	Door Position Switch	MC-4		DM
1	Power Supply	RPSMLR2		PR

NOTE: COORDINATION WITH ELECTRICAL, FIRE ALARM/ SMOKE EVAC SYSTEMS AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally closed, latched and secure. With activation of Smoke Evacuation System MLR exit device latches will retract allowing automatic operators to open doors. Exit devices can be electromechanically providing push-pull operation. With loss of power doors will be closed and latched. Immediate free egress at all times.

SET #9 - EHO PR ADA CROSS CORR + STAIR 1-2-4-5

Doors: A2A

1	Continuous Hinge	662HD UL X LAR	AL	ST
1	Continuous Hinge	662HD UL X LAR X EPT Prep	AL	ST
1	Power Transfer	EPT-12C		PR
1	Fire Exit Device	FL 2208 X V4908A LBR	630	PR
1	Exit Device	C FL MLR TS 2208 X V4908A LBR	630	PR
2	Rim Cylinder	12E-72 STD	626	BE
2	Magnetic Holder	EM 505-24120	689	DM
1	Closer (Pull Side)	TS9315 T LSN	689	DM
1	Automatic Operator	BY SECTION 08 7113	689	BY
2	Actuators	BY SECTION 08 7113	630	BY
4	Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1	Gasketing	5050 B Head & Jamb		NA
1	Smoke Seal	5070 B @ Meeting Edges		NA
1	Power Supply	RPSMLR2		PR

NOTE: COORDINATION WITH ELECTRICAL, FIRE ALARM SYSTEM AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally held open with electromagnetic holders. With activation of Fire Alarm System magnets will release allowing doors to close and latch. Outside lever trim can be locked or unlocked by mechanical key. Releasing the magnets will not change the condition of the outside trim; the the levers are locked they will remain locked; if they are unlocked they will remain unlocked. ADA operator will work in conjunction with MLR exit device. Immediate free egress from the push side of the door at all times.

SET #10 - EHO PR CROSS CORR + STAIR 1-2-5

Doors: A140, A21, C11, C1A, C1B, C1C, C21, D02, D12, D21, D2A, D2B, D3, D3A, D3B, C02, A2B, A11A, A11B

2 Continuous Hinge	662HD UL X LAR	AL	ST
2 Exit Device	FL 2208 X V4908A LBR	630	PR
2 Rim Cylinder	12E-72 STD	626	BE
2 Magnetic Holder	EM 505-24120	689	DM
	NOTE: Provide Model appropriate for conditions		
2 Closer (Pull Side)	TS9315 T LSN	689	DM
4 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Gasketing	5050 B Head & Jambs		NA
1 Smoke Seal	5070 B @ Meeting Edges		NA

NOTE: COORDINATION WITH ELECTRICAL, FIRE ALARM SYSTEM AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally held open with electromagnetic holders. With activation of Fire Alarm System magnets will release allowing doors to close and latch. Outside lever trim can be locked or unlocked by mechanical key. Releasing the magnets will not change the condition of the outside trim; the the levers are locked they will remain locked; if they are unlocked they will remain unlocked. Immediate free egress from the push side of the door at all times.

SET #11 - EHO EXTER PR AL 6070

Doors: XA12, XA11

2 Continuous Hinge	661HD UL X LAR	AL	ST
1 Removable Mullion	822	689	PR
2 Exit Device	2103	630	PR
2 Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
2 Electromagnetic Closer	TS9315 EMF/PT 120VAC	689	DM
2 Kick Plate	K0050 10" x 35" CSK	630	TR
2 Door Stop	1209	630	TR
1 Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1 Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA
2 Door Position Switch	MC-4		DM

NOTE: COORDINATION WITH ELECTRICAL, SECURITY AND FIRE ALARM SYSTEM REQUIRED.

OPERATION DESCRIPTION: Doors normally held open with electromagnetic holders. With signal from Access Control System or activation of Fire Alarm System magnets will release allowing doors to close and latch. Exit devices can be mechanically dogged down with hex key providing push-pull operation. With loss of power doors will remain locked unless they were mechanically dogged. Immediate free egress at all times.

SET #12 - EHO PR AL VESTIBULE

Doors: A10A, A10B

2	Continuous Hinge	661HD UL X LAR	AL	ST
1	Removable Mullion	822	689	PR
2	Exit Device	2103	630	PR
2	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
2	Electromagnetic Closer	TS9315 EMF/PT 120VAC	689	DM
4	Kick Plate	K0050 10" x 35" CSK	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
2	Door Position Switch	MC-4		DM

NOTE: COORDINATION WITH ELECTRICAL, FIRE ALARM SYSTEM AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally closed, latched and secure. Exit devices can be mechanically dogged down with hex key providing push-pull operation. Doors can be electrically held open and remotely released. With loss of power doors will close if they were open and be locked unless they were mechanically dogged. Immediate free egress at all times.

SET #13 - EHO PR STAIR

Doors: A1

2	Continuous Hinge	661HD UL X LAR	AL	ST
2	Push/Pull Plate Combo	1894-3	630	TR
2	Magnetic Holder	EM 505-24120	689	DM
2	Closer (Pull Side)	TS9315 T LSN	689	DM
4	Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
2	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY

NOTE: Verify not fire rated and no locking or latching required.

NOTE: COORDINATION WITH ELECTRICAL, FIRE ALARM SYSTEM AND SECURITY REQUIRED.

OPERATION DESCRIPTION: Doors normally held open with electromagnetic holders. With activation of Fire Alarm System magnets will release allowing doors to close providing push-pull operation. Immediate free egress at all times.

SET #14 - EHO PR CHAIR STORAGE UL

Doors: B129

6	Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1	Set Auto Flush Bolts	3815L X 3815L	630	TR
1	Dustproof Strike	3910	630	TR
1	Lockset	45H-7UNR15H STD	626	BE
		NOTE: Verify Lock Function		
1	Coordinator	3094B2	BLACK	TR
2	Closer (Pull Side)	TS9315 T LSN	689	DM
2	Magnetic Holder	EM 505-24120	689	DM
4	Kick Plate	K0050 16" x 35" CSK	630	TR
1	Gasketing	5050 B Head & Jambs		NA
1	Astragal	BY DOOR MFG		BY

NOTE: COORDINATION WITH ELECTRICAL, FIRE ALARM SYSTEM AND SECURITY REQUIRED.

OPERATION DESCRIPTION: When in use doors normally held open with electromagnetic holders. With activation of Fire Alarm System magnets will release allowing doors to close and latch. Immediate free egress at all times.

SET #20 - EXTER AL EXIT ONLY 3070

Doors: XA13

1	Continuous Hinge	661HD UL X LAR	AL	ST
1	Exit Device	2103	630	PR
1	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
1	Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1	Kick Plate	K0050 10" x 35" CSK	630	TR
1	Door Stop	1209	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1	Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA

SET #21 - EXTER PR AL EXIT 6070

Doors: XA17, XA16

2	Continuous Hinge	661HD UL X LAR	AL	ST
1	Removable Mullion	822	689	PR
2	Exit Device	2101	630	PR
2	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
2	Kick Plate	K0050 10" x 35" CSK	630	TR
2	Door Stop	1209	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1	Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA

SET #22 - EXTER PR - EXIT ONLY ELEC OS

Doors: XB17

2	Continuous Hinge	662HD UL X LAR	AL	ST
1	Removable Mullion	822	689	PR
2	Exit Device	2101	630	PR
2	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
2	Closer w/ HO (Push Side)	8916 DST FC SL	689	DM
2	Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
2	Door Stop	1209	630	TR
1	Gasketing - Head	700 NA X LAR		NA
2	Gasketing - Jambs	130 NA X LAR		NA
2	Door Sweep	D608A X LAR		NA
1	Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA

SET #23 - EXTER PR -STORERM LK OS

Doors: XB11, XB20

6 Hinges	CB199 4 1/2 X 4 1/2 NRP	US32D	ST
2 Surface Bolt	3923-12"	626	TR
1 Dustproof Strike	3910N	630	TR
1 Storeroom Lk w/ DBolt	45H-7TD15H STD	626	BE
NOTE: Less Outside Trim			
1 Anti-Vandal Pull	1096HA	630	TR
2 Closer w/ HO (Push Side)	8916 DST FC SL	689	DM
2 Edge Guard	KE36-1 30"	630	TR
2 Armor Plate	KA050 30" x 34 1/2" CSK-AP	630	TR
2 Door Stop	1209	630	TR
1 Gasketing - Head	700 NA X LAR		NA
2 Gasketing - Jambs	130 NA X LAR		NA
1 Astragal	BY DOOR MFG		BY
2 Door Sweep	D608A X LAR		NA
1 Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA

SET #24 - EXTER -STORERM LK OS

Doors: XD06

3 Hinges	CB199 4 1/2 X 4 1/2 NRP	US32D	ST
1 Storeroom Lk w/ DBolt	45H-7TD15H STD	626	BE
NOTE: Less Outside Trim			
1 Anti-Vandal Pull	1096HA	630	TR
1 Closer w/ HO (Push Side)	8916 DST FC SL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing - Head	700 NA X LAR		NA
2 Gasketing - Jambs	130 NA X LAR		NA
1 Door Sweep	D608A X LAR		NA
1 Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA

SET #25 - EXTER - EXIT 4-0 KITCHEN OS

Doors: XB18

1 Continuous Hinge	662HD UL X LAR	AL	ST
1 Exit Device	2103	630	PR
1 Anti-Vandal Pull	1097 PHI 21 P C S3	630	TR
1 Rim Cylinder	12E-72 STD	626	BE
1 Closer w/ HO (Push Side)	8916 DST FC SL	689	DM
1 Edge Guard	KE36-1 30"	630	TR
1 Armor Plate	KA050 30" x 34 1/2" CSK-AP	630	TR
1 Door Stop	1209	630	TR
1 Gasketing - Head	700 NA X LAR		NA
2 Gasketing - Jambs	130 NA X LAR		NA
1 Door Sweep	D608A X LAR		NA
1 Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA

SET #26 - EXTER LOCK EXIT ONLY OS

Doors: XB16

1 Continuous Hinge	662HD UL X LAR	AL	ST
1 Exit Set	45H-0NX15H	626	BE
	NOTE: Less Outside Trim		
1 Closer (Push Side)	8616 DS FC SL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing - Head	700 NA X LAR		NA
2 Gasketing - Jambs	130 NA X LAR		NA
1 Door Sweep	D608A X LAR		NA
1 Threshold	896 S X LAR X 1/4 20 SSMS/EA	AL	NA

SET #27 - EXTER MECH OS

Doors: XA15

1 Continuous Hinge	662HD UL X LAR	AL	ST
1 Storeroom Lock	9K3-7D15D STD S3 TL/O	626	BE
1 Closer (Push Side)	8916 SPA FC SL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Lock Guard	5001	630	TR
2 Gasketing - Jambs	130 NA X LAR		NA
1 Gasketing - Head	700 NA X LAR		NA
1 Door Sweep	D608A X LAR		NA
1 Threshold	897 NS 36"	AL	NA

SET #28 - EXTER STOR LK IS

Doors: XU01

1 Continuous Hinge	662HD UL X LAR	AL	ST
1 Storeroom Lock	9K3-7D15D STD S3	626	BE
1 Closer w/ DA (Pull side)	8916 IS DA FC SL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing - Head	130 NA 36"		NA
2 Gasketing - Jambs	130 NA X LAR		NA
1 Door Sweep	D608A X LAR		NA
1 Threshold	897 NS 36"	AL	NA

SET #30 - PR GYM EXIT AL

Doors: A138B, A138A

2	Continuous Hinge	661HD UL X LAR	AL	ST
1	Removable Mullion	822	689	PR
2	Exit Device	2103	630	PR
1	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
1	Anti-Vandal Pull	1097 PHI 21 P C S3	630	TR
1	Rim Cylinder	12E-72 STD	626	BE
2	Closer w/ HO (Push Side)	TS9315 PTH LSN	689	DM
2	Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
2	Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
2	Door Stop	1209	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY

SET #31 - PR GYM EXIT P-P

Doors: A138C, A138D

2	Continuous Hinge	662HD UL X LAR	AL	ST
1	Removable Mullion	822	689	PR
2	Exit Device	2103	630	PR
2	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
2	Closer (Push Side)	TS9315 SPT CS LSN	689	DM
2	Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
2	Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
2	Door Stop	1209	630	TR
2	Gasketing	5050 B Head & Jambs		NA

SET #32 - PR ALSERV EXIT 180 DEG HO

Doors: B124F, B124A

2	Continuous Hinge	661HD UL X LAR	AL	ST
1	Removable Mullion	FL822	689	PR
2	Exit Device	FL2102	630	PR
2	Electromagnetic Holder	2510 24VAC/DC		
NOTE: Accommodation for mounting or alternate mag holder may need to be selected for sidelight frames				
2	Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
2	Closer (Push Side) non-HO	8916 SPA FCSL	689	DM
NOTE: Install to obtain 180 degree opening				
2	Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
2	Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1	Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY

NOTE: COORDINATION WITH ELECTRICAL, FIRE ALARM SYSTEM AND SECURITY REQUIRED

SET #33 - AL SERV EXIT + CL W/ HO

Doors: B124C, B124D, B124B, B124E

1 Continuous Hinge	661HD UL X LAR	AL	ST
1 Exit Device	FL2102	630	PR
1 Electromagnetic Holder	2510 24VAC/DC		
NOTE: Accommodation for mounting or alternate mag holder may need to be selected for sidelight frames			
1 Anti-Vandal Pull	1097 PHI 21 P N S3	630	TR
1 Closer (Push Side) non-HO	8916 SPA FCSL	689	DM
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY

NOTE: COORDINATION WITH ELECTRICAL, FIRE ALARM SYSTEM AND SECURITY REQUIRED

SET #34 - NOT USED**SET #35 - AL CLASS OS**

Doors: C001

1 Continuous Hinge	661HD UL X LAR	AL	ST
1 Classroom Lock	45H-7R15H STD	626	BE
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate	K0050 10" x 35" CSK	630	TR
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY

SET #36 - AL CLASS INT OS

Doors: A101B

1 Continuous Hinge	661HD UL X LAR	AL	ST
1 Classroom IN Lock	45H-7INL15H STD	626	BE
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate	K0050 10" x 35" CSK	630	TR
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY

SET #37 - AL UNR OS CS

Doors: A103, A215B

1 Continuous Hinge	661HD UL X LAR	AL	ST
1 Lockset	45H-7UNR15H STD	626	BE
NOTE: Verify Lock Function			
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate	K0050 10" x 35" CSK	630	TR
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY

SET #38 - AL UNR + CL IS

Doors: C002, C224

1 Continuous Hinge	661HD UL X LAR	AL	ST
1 Lockset	45H-7UNR15H STD	626	BE
1 Kick Plate	K0050 10" x 35" CSK	630	TR
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1 Closer w/ Stop (Pull Side)	TS9315 ST CS LSN	689	DM
1 Door Stop	1209	630	TR

SET #39 - AL A OFFICE OS OHS

Doors: A115

1 Continuous Hinge	661HD UL X LAR	AL	ST
1 Office Lock	45H-7A15H STD	626	BE
1 Overhead Stop	910 S	626	DM
1 Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY

SET #39A - AL A OFFICE IS

Doors: B123

1 Continuous Hinge	661HD UL X LAR	AL	ST
1 Office Lock	45H-7A15H STD	626	BE
1 Gasketing + Sweeps	BY ALUMINUM DOOR MANUFACTURER		BY
1 Door Stop	1209	630	TR

SET #40 - CLASSROOM QAL LOCK IS

Doors: A216B, A217, C011, C014, C015, C016, C017, C019, C107, C108, C109, C110, C112, C113, C203, C204, C207, C212, C214, C215, C216, C218, C219, C220, D006, D008, D009, D010, D011, D013, D105, D107, D108, D109, D110, D112, D205, D207, D208, D209, D210, D212

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 QAL Classroom Lock	SSI Guardian QAL E M1	630	SECU
2 Mortise Cylinder	1E-74 STD	626	BE
1 Closer (Pull Side)	TS9315 T LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #41 - CLASSRM QAL LKS OS

Doors: C020B, C023A, C023B, C101A, C101B, C102A, C116A, D002A, D002B, D005A, D005B, D101A, D101B, D104A, D104B, D201A, D201B, D204A, D204B, C020A

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 QAL Classroom Lock	SSI Guardian QAL E M1	630	SECU
2 Mortise Cylinder	1E-74 STD	626	BE
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

NOTE: DOOR C101A MUST OPEN TO 180 DEGREES – CHANGE CLOSER MODEL ACCORDINGLY

NOTE: OMIT FLOOR STOP FOR D005B

SET #42 - CLASS QAL LK STC IS

Doors: B101A

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 QAL Classroom Lock	SSI Guardian QAL E M1	630	SECU
2 Mortise Cylinder	1E-74 STD	626	BE
1 Closer (Pull Side)	TS9315 T LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	107 NA 1 x 36" 2 x 86"		NA
1 Auto Door Bottom	423 N 36"		NA
1 Threshold	897 NS 36"	AL	NA

SET #43 - CLASS QAL LKS STC OS

Doors: B102A, B103B, B101B

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 QAL Classroom Lock	SSI Guardian QAL E M1	630	SECU
2 Mortise Cylinder	1E-74 STD	626	BE
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing - Head	700 NA X LAR		NA
2 Gasketing - Jambs	120 NA X LAR		NA
1 Auto Door Bottom	423 N 36"		NA
1 Threshold	897 NS 36"	AL	NA

SET #45 - PR CLASS QAL LK OS

Doors: C102B

6 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Set Auto Flush Bolts	3815L X 3815L	630	TR
1 Dustproof Strike	3910	630	TR
1 QAL Classroom Lock	SSI Guardian QAL E M1	630	SECU
2 Mortise Cylinder	1E-74 STD	626	BE
1 Coordinator	3092	BLACK	TR
2 Closer (Push Side)	TS9315 PT LSN	689	DM
4 Kick Plate	K0050 10" x 35" CSK	630	TR
2 Door Stop	1209	630	TR
1 Astragal	BY DOOR MFG		BY
2 Door Silencers	1229A	GREY	TR

SET #46 - PR BAND CLASS QAL STC OS

Doors: B103A

8 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Set Auto Flush Bolts	3815L X 3815L	630	TR
1 Dustproof Strike	3910	630	TR
1 QAL Classroom Lock	SSI Guardian QAL E M1	630	SECU
2 Mortise Cylinder	1E-74 STD	626	BE
1 Coordinator	3092	BLACK	TR
2 Closer w/ HO (Push Side)	TS9315 PTH LSN	689	DM
4 Kick Plate	K0050 10" x 35" CSK	630	TR
2 Door Stop	1209	630	TR
1 Gasketing - Head	700 NA X LAR		NA
2 Gasketing - Jambs	120 NA X LAR		NA
1 Astragal	122 NA 86"		NA
2 Auto Door Bottom	220 SA 36"		NA
1 Threshold	897 NS 72"	AL	NA

SET #47 - PR CLASS QAL LK OS 180 Deg

Doors: C116B

6 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Set Auto Flush Bolts	3815L X 3815L	630	TR
1 Dustproof Strike	3910	630	TR
1 QAL Classroom Lock	SSI Guardian QAL E M1	630	SECU
2 Mortise Cylinder	1E-74 STD	626	BE
1 Coordinator	3092	BLACK	TR
2 Mounting Bracket	3095 OR 3096 AS REQ'D	BLACK	TR
2 Closer (Push Side)	8916 SPA FCSL	689	DM
NOTE: Template to obtain 180 degree opening			
4 Kick Plate	K0050 10" x 35" CSK	630	TR
2 Door Stop	1209	630	TR
1 Astragal	BY DOOR MFG		BY
2 Door Silencers	1229A	GREY	TR

SET #50 - CLASS LK + CL IS

Doors: A201, A205, C106, C202, D012, D016, D111, D116, D211, D216, C013

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Classroom Lock	45H-7R15H STD	626	BE
1 Closer (Pull Side)	TS9315 T LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #51 - CLASS LK IS

Doors: A102, A109, A119, B103C, A108

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Classroom Lock	45H-7R15H STD	626	BE
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #52 - CLASS LK + HO SCIENCE PREP

Doors: C022A, C022B, D004A, D004B, D103A, D103B, D203A, D203B

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Classroom Lock	45H-7R15H STD	626	BE
1 Closer w/ HO (Pull Side)	TS9315 TH LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #53 - CLASS INT + CL UL IS

Doors: A113

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Classroom IN Lock	45H-7INL15H STD	626	BE
1 Closer (Pull Side)	TS9315 T LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #54 - CLASS INT + CL UL OS

Doors: A23, A12, C01

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Classroom IN Lock	45H-7INL15H STD	626	BE
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #55 - CLASS INT + CL UL OS

Doors: A15, A126C

1 Continuous Hinge	662HD UL X LAR	AL	ST
1 Classroom IN Lock	45H-7INL15H STD	626	BE
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #56 - CLASS LK + CL IS OHS

Doors: C213

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Classroom Lock	45H-7R15H STD	626	BE
1 Closer w/ Stop (Pull Side)	TS9315 ST CS LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
3 Door Silencers	1229A	GREY	TR

SET #57 - CLASS LK IS OHS

Doors: B103D, C116C, B102C

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Classroom Lock	45H-7R15H STD	626	BE
1 Overhead Stop	910 S	626	DM
3 Door Silencers	1229A	GREY	TR

SET #58 - CLASS + CL OS

Doors: C003B, C004, A206, A215A

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Classroom Lock	45H-7R15H STD	626	BE
1 Closer (Push Side)	TS9315 PT LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #59 - CLASS OS

Doors: C116D

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Classroom Lock	45H-7R15H STD	626	BE
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #60 - OFFICE LK "A"

Doors: A113A, A116, A123, A124, A133A, A136B, A207, A208, A209, A210, A211, A212, A213, B116, C003

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Office Lock	45H-7A15H STD	626	BE
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #61 - OFFICE "A" W/ CLOSER IS

Doors: A133, A136A, C009, C010, C103, C104, C201, C205, C206, C208, C209, C211, C221, C223

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Office Lock	45H-7A15H STD	626	BE
1 Closer (Pull Side)	TS9315 T LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #62 - COMMUNITY "AB" W/ CLOSER OS

Doors: A128, A129, A127

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Office Lock	45H-7AB15H STD	626	BE
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #63 - OFFICE LK "AB"

Doors: A120, A121

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Office Lock	45H-7AB15H STD	626	BE
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #70 - STORERM LK - TELECOM - CNTRL RM (UL)

Doors: A110, B110, C005, D017, D118, D218

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Storeroom Lock	9K3-7D15D STD S3	626	BE
1 Closer (Pull side)	8916 IS FCSL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #71 - MECH-ELEC IS 90 DEG WALL (UL)

Doors: A118, A219, C012, C105, C222, D014, D023, D213

3 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
1 Storeroom Lock	9K3-7D15D STD S3 TL/O	626	BE
1 Closer (Pull side)	8916 IS FCSL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #72 - MECH IS NO 90 DEG WALL

Doors: A107, C210, D003, C021, D102, D113

3 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
1 Storeroom Lock	9K3-7D15D STD S3 TL/O	626	BE
1 Closer w/ Stop (Pull Side)	8916 S-IS FCSL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #73 - MECH + CL OS

Doors: C115, D202, B112, A218B, A218A

3 Hinges	CB199 4 1/2 X 4 1/2 NRP	US32D	ST
1 Storeroom Lock	9K3-7D15D STD S3 TL/O	626	BE
1 Closer w/ Stop (Push side)	8916 S-DS FCSL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Gasketing	5050 B Head & Jamb		NA

SET #74 - STORERM LK OS

Doors: B118, D023B

3 Hinges	CB199 4 1/2 X 4 1/2 NRP	US32D	ST
1 Storeroom Lock	9K3-7D15D STD S3	626	BE
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #75 - CUSTODIAL IS 90 DEG WALL

Doors: A134A, B128

3 Hinges	CB191 4 1/2 X 4 1/2	US32D	ST
1 Storeroom Lock	9K3-7D15D STD S3	626	BE
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #76 - CUSTODIAL + CLOSER IS 90 DEG WALL

Doors: D018, D219, D119

3 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
1 Storeroom Lock	9K3-7D15D STD S3	626	BE
1 Closer (Pull side)	8916 IS FCSL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #77 - CUSTODIAL OS OHS

Doors: A204, A3A

3 Hinges	CB199 4 1/2 X 4 1/2 NRP	US32D	ST
1 Storeroom Lock	9K3-7D15D STD S3	626	BE
1 Overhead Stop	910 S	626	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
3 Door Silencers	1229A	GREY	TR

SET #78 - PR CUSTODIAL STOR + CLOSER IS

Doors: B109

8 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Surface Bolt	3923-24"	626	TR
1 Surface Bolt	3923-12"	626	TR
1 Dustproof Strike	3910	630	TR
1 Storeroom Lock	9K3-7D15D STD S3	626	BE
1 Closer w/ HO+DA (Pull side)	8916 ISH DA FC SL	689	DM
2 Edge Guard	KE36-1 30"	630	TR
4 Armor Plate	KA050 30" x 34 1/2" CSK-AP	630	TR
2 Door Stop	1209	630	TR
1 Astragal	BY DOOR MFG		BY
2 Door Silencers	1229A	GREY	TR

SET #79 - PR EMERG GEN OS UL

Doors: B118A

8 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
2 Surface Bolt	3923	626	TR
1 Dustproof Strike	3910	630	TR
1 Storeroom Lock	9K3-7D15D STD S3	626	BE
1 Closer w/ Stop DA (Push Side)	8916 S-DS DA FC SL	689	DM
1 Astragal	BY DOOR MFG		BY
1 Gasketing	5050 B Head & Jambs		NA

SET #80 - D - STORAGE IS

Doors: B117, C102C, A116A

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Storeroom Lock	45H-7D15H STD	626	BE
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #81 - D - STORAGE OS OHS

Doors: D025

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Storeroom Lock	45H-7D15H STD	626	BE
1 Overhead Stop	910 S	626	DM
3 Door Silencers	1229A	GREY	TR

SET #83 - TD + CL - STORAGE OS

Doors: C006, D015, D117, D217, D223

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Storeroom Lk w/ DBolt	45H-7TD15H STD	626	BE
1 Closer w/ HO+DA (Pull side)	8916 ISH DA FCSL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #84 - TD + CL - UL STORAGE IS

Doors: D123, D022

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Storeroom Lk w/ DBolt	45H-7TD15H STD	626	BE
1 Closer w/ DA (Pull side)	8916 IS DA FCSL	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #85 - TD STORERM LK RECORDS STORAGE IS

Doors: A214

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Storeroom Lk w/ DBolt	45H-7TD15H STD	626	BE
1 Overhead Stop	910 S	626	DM
3 Door Silencers	1229A	GREY	TR

SET #86 - TD + CL STORAGE OS

Doors: C114

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Storeroom Lk w/ DBolt	45H-7TD15H STD	626	BE
1 Closer w/ Stop DA (Push Side)	8916 S-DS DA FCSL	689	DM
1 Edge Guard	KE36-1 30"	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Armor Plate	KA050 30" x 34 1/2" CSK-AP	630	TR
3 Door Silencers	1229A	GREY	TR

SET #90 - UNR KITCHEN STORAGE IS

Doors: B122

3 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
1 Lockset	45H-7UNR15H STD	626	BE
	NOTE: Verify Lock Function		
1 Edge Guard	KE36-1 30"	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Armor Plate	KA050 30" x 34 1/2" CSK-AP	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA
1 Door Sweep	D608A X LAR		NA

SET #91 - UNR LAUNDRY + CL IS

Doors: A134, A126A, A126a

3 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
1 Lockset	45H-7UNR15H STD	626	BE
	NOTE: Verify Lock Function		
1 Closer (Pull Side)	TS9315 T LSN	689	DM
1 Edge Guard	KE36-1 30"	630	TR
2 Armor Plate UL Rated	KA050 30" x 34 1/2" CSK-AP	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA

SET #95 - UNR PR STORAGE IS 60710

Doors: B111, B113

8 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Surface Bolt	3923-24"	626	TR
1 Surface Bolt	3923-12"	626	TR
1 Dustproof Strike	3910	630	TR
1 Lockset	45H-7UNR15H STD	626	BE
	NOTE: Verify Lock Function		
2 Edge Guard	KE36-1 30"	630	TR
4 Armor Plate	KA050 30" x 34 1/2" CSK-AP	630	TR
2 Door Stop	1209	630	TR
1 Astragal	BY DOOR MFG		BY
2 Door Silencers	1229A	GREY	TR

SET #96 - UNR PR STORERM IS UL 60710

Doors: A142, A139

8 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Surface Bolt	3923-24"	626	TR
1 Surface Bolt	3923-12"	626	TR
1 Dustproof Strike	3910	630	TR
1 Lockset	45H-7UNR15H STD	626	BE
	NOTE: Verify Lock Function		
2 Closer (Pull Side)	TS9315 T LSN	689	DM
4 Kick Plate	K0050 16" x 35" CSK	630	TR
2 Door Stop	1209	630	TR
1 Astragal	BY DOOR MFG		BY
1 Gasketing	5050 B Head & Jambs		NA

SET #100 - PRIV TLT IS

Doors: A114, A117, A125, A132, A137, A202, A203, B107A, B108A, B121, C003A

3 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
1 Privacy Set w/ Indicator	45H-0L15H VIB	626	BE
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #101 - PRIV TLT + CLOSER IS

Doors: A105, B105, D016B, D020, D114, D115, D121, D214, D215, D221, D016A

3 Hinges	CB191 4 1/2 X 4 1/2	US32D	ST
1 Privacy Set w/ Indicator	45H-0L15H VIB	626	BE
1 Closer (Pull Side)	TS9315 T LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #102 - PRIVACY OS

Doors: A121A, A122

3 Hinges	CB191 4 1/2 X 4 1/2	US32D	ST
1 Privacy Set w/ Indicator	45H-0L15H VIB	626	BE
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #103 - PRIVACY + CLOSER OS

Doors: D116A

3 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
1 Privacy Set w/ Indicator	45H-0L15H VIB	626	BE
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate (Pull Side)	K0050 10" x 35" CSK	630	TR
1 Gasketing	5050 B Head & Jamb		NA

SET #104 - PP + PULL SIDE CLOSER

Doors: A131A, A135A

3 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
1 Push/Pull Plate Combo	1894-3	630	TR
1 Closer (Pull Side)	TS9315 T LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #105 - PP + PULL SIDE HO CLOSER

Doors: B107, B108, B120

3 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
1 Push/Pull Plate Combo	1894-3	630	TR
1 Closer w/ HO (Pull Side)	TS9315 TH LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #106 - PUSH-PULL + PUSH SIDE CLOSER

Doors: A131B, A135B

1 Continuous Hinge	661HD UL X LAR	AL	ST
1 Push/Pull Plate Combo	1894-3	630	TR
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
3 Door Silencers	1229A	GREY	TR

SET #108 - PR WASH-DRY CLOSET

Doors: A126A

6 Hinges	CB199 4 1/2 X 4 1/2	US32D	ST
2 Flush Pull	1111C	630	TR
2 Overhead Stop	910 S	626	DM
2 Roller Latch	1559W A-STRIKE	626	TR

SET #109 - PASSAGE OS OHS

Doors: A12A

3 Hinges	CB168 4 1/2 X 4 1/2	US26D	ST
1 Passage Set	45H-0N15H	626	BE
1 Overhead Stop	910 S	626	DM
3 Door Silencers	1229A	GREY	TR

SET #110 - EXIT DEVICE SGL

Doors: C22B, C22A

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Exit Device	2108 X V4908A	630	PR
1 Rim Cylinder	12E-72 STD	626	BE
1 Closer (Push Side)	TS9315 PT LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jamb		NA

SET #111 - EXIT DEVICE SGL STAIR

Doors: B1

3 Hinges	CB168 4 1/2 X 4 1/2 NRP	US26D	ST
1 Fire Exit Device	FL 2108 X V4908A	630	PR
1 Rim Cylinder	12E-72 STD	626	BE
1 Closer (Push Side)	TS9315 SPT CS LSN	689	DM
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Gasketing	5050 B Head & Jamb		NA

SET #115 - G COMM LK

Doors: A126B

3 Hinges	CB199 4 1/2 X 4 1/2 NRP	US32D	ST
1 Communicating Lock	45H-7G15H STD	626	BE
1 Kick Plate (Push Side)	K0050 - 10" x 1.5" LDW CSK	630	TR
1 Kick Plate	K0050 - 10" x 1" LDW CSK	630	TR
1 Door Stop	1209	630	TR
1 Gasketing	5050 B Head & Jambs		NA
1 Door Sweep	D608A X LAR		NA

MANUFACTURER LIST

<u>Code</u>	<u>Name</u>
BE	Best Access Systems
BY	By Others
DM	Dorma Door Controls
NA	National Guard
PR	Precision
SECU	Securitech
ST	Stanley
TR	Trimco

OPTION LIST

<u>Code</u>	<u>Description</u>
C	Quick Connect Wiring System
CS	Cushion Stop
DA	ADJUSTABLE DELAYED ACTION
FL	Fire Exit Hardware
S3	ANSI Strike Package
TS	TOUCHBAR MONITORING SWITCH
24V	24V Solenoid (Std)
CSK	COUNTER SINKING OF KICK and MOP PLATES
LBR	LESS BOTTOM ROD
LSN	Less Sex Nuts (SN3 pkg)
MLR	MOTORIZED LATCH RETRACTION
RQE	REQUEST TO EXIT
VIB	Double Visual Indicator Option
FCSL	Full Plastic Slotted Cover
TL/O	TACTILE LEVER - Outside
120VAC	120 Volt AC
CSK-AP	COUNTER SINKING OF ARMOUR PLATES
7/8"LTC	7/8" Lip-To-Center Strike
EPT Prep	EPT Prep (full mortise)
1/4-20 SSMS/EA	STAINLESS MACHINE SCREWS/EXPANSION ANC.

FINISH LIST

<u>Code</u>	<u>Description</u>
AL	Aluminum
600	Primed for Painting
626	Satin Chromium Plated
630	Satin Stainless Steel
689	Aluminum Painted
GREY	Grey
BLACK	Black
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

END OF HARDWARE SETS

SECTION 08 71 13 - AUTOMATIC DOOR OPERATORS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Low-energy door operators for swinging doors.
- B. Doors to receive operators are not to be operable for general ingress or egress from the building; they will be activated in the event of the smoke evacuation system being activated; a device will be included for the prevention of individuals being struck by the door during these events.

1.2 DEFINITIONS

- A. Activation device: Device that, when actuated, sends an electrical signal to the door operator to initiate the door operation.
- B. Monitored Safety Devices: A tested system that works in conjunction with the automatic door control that detects the presence of a person or an object within a zone where contact could occur and provides a signal to stop the movement of the door.
- C. AAADM: American Association of Automatic Door Manufacturers.
- D. Operating ambient Temperature Range: 5 Degrees F to plus 122 degrees F (minus 15 C to 50 degrees C).
- E. For automatic door terminology, refer to ANSI/BHMA A 156.19 for definitions of terms.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide automatic doors that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturers corresponding systems.
- B. Compliance:
 - 1. ICC/IBC International Building Code
 - 2. ANSI/BHMA A 156.19 American National Standard for Power Operated Doors Pedestrian Doors.
 - 3. UL 325 Listed
 - 4. NFPA 70 National Electrical Code.
 - 5. NFPA 101 Life Safety Code
 - 6. CUL Approved for use in Canada
 - 7. UL Listed Fire Door Operator with Automatic Closer
- C. Automatic Door equipment accommodates medium to heavy pedestrian traffic.
- D. Opening Force Requirements:
 - 1. Power-Operated swinging doors shall open with a manual force not to exceed 30 lbf (133N) to set the door in motion and 15 lbf to fully open the door with force applied at 1" (25mm) from the latched edge of the door. The required force to prevent a stopped door from opening or closing shall to exceed 15 lbf (67N) measured 1" (25mm) from the latch edge of the door at any point during the opening or closing.
- E. Closing Time:
 - 1. Door operators shall be field adjustable to close 90 degrees to 10 degrees in 3 seconds or longer per ANSI/BHMA A 156.19 standard.
 - 2. Door shall be field adjusted to close from 10 degrees to fully closed position in not less than 1.5 seconds.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles fabrication, operational descriptions and finishes.
- B. Shop Drawings: For automatic entrances. Include plans, elevations, sections, details, hardware mounting heights, additional accessories and attachments to other work.
- C. Samples: color samples of exposed finish as required.
- D. Informational Submittals: Manufacturers product information and applicable sustainability program credits that are available towards a LEED rated product certification.
 - 1. Credit MR 4.1 and 4.2: Manufacture's or fabricator's certificate indicating percentage of post-consumer recycled content by weight and pre-consumer recycled content by weight for each product specified under this section.
- E. Manufacturers Field Reports: Submit manufacturer's field reports from AAADM certified technician of inspection and approval of doors for compliance with ANSI/BHMA A 156.19 after completion of installation.
- F. Operating and Maintenance Manuals: Provide manufacturers operating, owners and maintenance manuals for each item specified as required in Division 01, Closeout Submittals.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: 10 years minimum of documented experience in manufacturing door equipment similar to that indicated within this specification with a proven record of successful service performance. A manufacturer with company certificate issued by AAADM.
- B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 5 years documented experience installing and maintenance of units similar in material, design, and extent to that indicated in this specification and whose work has resulted in construction with a record of successful in-service performance. Manufacturer's authorized representative who is trained and approved for installation and maintenance of units by AAADM required for this Project
- C. Source Limitations for Automatic Operators: Obtain each type of automatic door operator and sensor components specified in this section from single source from single manufacturer.
- D. 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.
- E. Power-Operated Door Standard: ANSI/BHMA A 156.19 Current year.
- F. Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for automatic entrances serving as a required means of egress.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings to receive automatic entrances by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate door operators with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Coordinate hardware for automatic entrances with hardware required for rest of project.

- B. Electrical System Roughing-in: Coordinate layout and installation of automatic power door operator with connections to power supplies and access-control system.

1.8 WARRANTY

- A. Automatic Door Operators to be free of defects in material and workmanship for a period of One year from the date of substantial completion.
- B. Safety Sensors to be free of defects in material and workmanship for a period of One year from the date of substantial completion.
- C. During the warranty period a factory trained technician shall preform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form submitted to the owner.
- D. During the warranty period all warranty work shall be performed during normal working hours.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Automatic Swing Door Operator: Dormakaba (Basis-of-Design): www.dormakaba.us
 - 1. Other Available Manufacturers:
 - a. Horton.
- B. Safety Sensor (Basis-of-Design): LZR Flatscan by BEA.

2.2 AUTOMATIC SWING DOOR OPERATOR

- A. Model: DORMA, ED Series ED100 (Basis of Design) An Integrated, self-learning automatic swing door operator with an advanced CPU, a multistage gearbox with real time adaptive software and available user interface.
 - 1. Automatic Door Configuration:
 - a. Configuration: Single swing door or pair of doors swinging.
 - b. Traffic Pattern: As shown on Drawings.
 - c. Mounting: Surface applied
- B. Control Features
 - 1. Power-hold Close
 - 2. Built in Lock Delay
 - 3. On-Off-Hold Open switch control to control door function, (Automatic-Hold Open- Exit Only)
 - 4. On-Off Power Switch
 - 5. Fire Alarm Integration
 - 6. Field Adjustable Handing
 - 7. Push and Go
 - 8. Power Assist Opening Activation
 - 9. Intergraded Connections for Monitored Safety Sensors and other accessories.
 - 10. Integrated access control
- C. Door Control Features
 - 1. Wind Load and Stack Pressure microprocessor monitored with power boost to ensure secure opening and closing in changing conditions.
 - 2. Door Weight Max. ED 100 220 lbs.
- D. Header Size: Narrow header at 4" height by 6" depth.

2.3 ACTIVATION BY SMOKE EVACUATION SYSTEM

- A. General: Provide activation by smoke alarm evacuation. Coordinate other required activation devices and safety devices with door operation and door operator controls.
- B. Activation: Smoke evacuation system shall provide activation of the operator by means of a contact point within the door operator to control the opening and closing of the door in the event of an alarm condition. Doors are to be held open until the smoke evacuation system is reset. Door position status integrated within operator and control without additional relays or magnets.

2.4 ACTIVATION DEVICES

- A. Activation Device:
 - 1. Push Plate: Hard wired, 4-3/4 inch square stainless steel push plate engraved with "Push to Open" with a handicap logo.]
 - 2. Access control activator: As selected by architect.

2.5 SAFETY DEVICES

- A. Provide door controls in accordance with ANSI/BHMA standards A 156.19 and complying with cited BHMA standard for condition of exposure and for long-term, maintenance-free operation under normal traffic load. When presence sensors are used, they shall be monitored in accordance with ANSI/BHMA A 156.10. Coordinate controls with door operation and door operators.
- B. Presence Detection Systems and Safety Devices: LASER-based Time-of-Flight presence sensor for use as a reactivation sensor on the approach side of low energy doors; technology generates 170 detection points across a single curtain and 100 detection points within the hinge area of the door.
 - 1. Technology: LASER scanner, time-of-flight measurement.
 - 2. Detection Mode: Presence.
 - 3. Max. Detection Range: 13' (diagonal) with reflectivity of 2%
 - 4. Detection Area:
 - a. Door Leaf Safety: 90 degrees.
 - b. Pinch Zone Safety: 16 degrees.
 - 5. Angular Resolution:
 - a. Door Leaf Safety: 1.3 degrees.
 - b. Pinch Zone Safety: 0.2 degrees.
 - 6. Typ. Min. Object Size:
 - a. Door Leaf Safety: 4" @ 13' (in proportion to object distance, DIP 2 = ON)
 - b. Pinch Zone Safety: 3/4" @ 13' (in proportion to object distance, DIP 2 = ON)
 - 7. Emission Characteristics IR LASER: Wavelength 905 nm; max. output pulse power 25 W; Class 1
 - 8. Response Time:
 - a. Door Leaf Safety: max. 50 ms
 - b. Pinch Zone Safety: max. 90 ms
 - 9. Material / Color: Selected from manufacturer's standard.

2.6 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Painted Finish:
 - 1. Powder coat painted to match architects' sample.

EXECUTION**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine doors and frames with Installer present, for compliance with requirements for installation tolerances, wall and floor construction and other conditions affecting performance of automatic entrances.
- B. Examine roughing in for electrical source power to verify actual locations of wiring connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints.
- B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
 - 1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
 - 2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
- C. Door Operators: Connect door operators to electrical power distribution system as specified in Division 26 Sections including smoke evacuation and/or fire detection system.
- D. Sealants: Comply with requirements specified in Division 07 Section "Joint Sealants" to provide seal between the operator housing and wall surface. installation.
- E. Signage: Apply signage on both sides of each door and each sidelight as required by ANSI/BHMA A 156.19

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's representative shall provide technical assistance and guidance for installation of automatic doors.
 - 1. Factory trained and AAADM certified representative shall test and inspect each automatic door to determine compliance of the installed system to ANSI/BHMA A 156.19

3.4 ADJUSTING

- A. Adjust door operators and controls for smooth and safe operation.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by automatic operator installation promptly after installation.

3.6 DEMONSTRATION

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

END OF SECTION

SECTION 08 80 00 - GLAZING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Glass.
- B. Glazing compounds and accessories.
- C. Standoff point connections of structural glass at interior decorative panels and signage.

1.2 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014a.
- D. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- F. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- I. GANA (GM) - GANA Glazing Manual; 2009.
- J. GANA (SM) - GANA Sealant Manual; 2008.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Samples: Submit two samples 12 by 12 inch in size of glass units.
- E. Standoff Fittings Samples: For each type determined through delegated design; approved physical samples will be returned for use on Project.
- F. Delegated-Design Submittal - Standoff Fittings Interior Decorative Panels: To comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- G. Certificates: Certify that products meet or exceed specified requirements.
- H. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For glass, if applicable: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 4: BPDO - Material Ingredients
 - a. For glass, if applicable: Material Ingredient Report.
 - 3. EQ Credit 2: Low-Emitting Materials

- a. For interior wet-applied sealants and sealants primers: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
- b. EQ Credit 7: Daylight
 - 1) For all exterior glazing: Visible light transmittance value.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.

1.5 MOCK-UP

- A. Locate within framing set in masonry mockup.

1.6 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

1.7 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.
- C. Laminated Glass: Provide a five (5) year warranty to include coverage for delamination, including replacement of failed units.

PART 2 PRODUCTS

2.1 EXTERIOR GLAZING ASSEMBLIES

- A. Performance Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass calculated in accordance with IBC 2015 - International Building Code.
 1. Glass thicknesses listed are minimum; provide Delegated Design to determine additional thickness as required.

2.2 GLASS MATERIALS

- A. Float Glass Manufacturers:
 1. Cardinal Glass Industries: www.cardinalcorp.com.
 2. Guardian Industries Corp: www.sunguardglass.com.
 3. AGC Flat Glass North America: www.afgglass.com.
 4. Pilkington North America Inc: www.pilkington.com/na.
 5. PPG Industries, Inc: www.ppgideascales.com.
- B. Float Glass: Provide float glass based glazing unless noted otherwise.
 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
 2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.
 3. Tinted Types: ASTM C1036, Class 2 - Tinted, color and performance characteristics as indicated.

4. Thicknesses: As indicated; for exterior glazing comply with requirements indicated for wind load design regardless of thickness indicated.
- C. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
1. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
 - a. Plastic Interlayer:
 - 1) Polyvinyl Butyral (PVB) Interlayer - Typical: 0.030 inch thick, minimum.
 - (a) Translucent Glazing Type: Translucent interlayer; one layer 0.030 translucent polyvinyl butyral with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation equivalent to "Artic Snow 216500" by Solutia, Inc.
 - 2) Polyvinyl Butyral (PVB) Interlayer - Color for IGU Glass Type G-5: 0.060 inch thick, minimum.
 - (a) Product Standard: Solutia, Inc.; Architect reserves the option to select 6 maximum colors for a maximum 800 square feet of glazing area, at no additional cost.
 - 3) Opaque Spandrel Glazing Type: Two layers minimum 0.030 inch for each layer; minimum 0.060 inch total thickness.
 - (a) Layer colors to be selected by Architect; may be different colors to produce combined color.
 - (b) Result to be opaque.
 - (c) Heat-strengthened glass.
 2. Laminated Glass acting as a Guard, including Glass Baluster railing, and within Insulated Glass Units for Skylight Assemblies:
 - a. Basis-of-Design Interlayer Product: DuPont™ SentryGlas® Ionoplast Interlayer, as manufactured by DuPont™ Glass Laminating Solutions; 4417 Lancaster Pike, Wilmington, DE 19805; www.sentryglas.com.
 - b. Thickness: As determined by glass fabricator for condition;.
 - c. Interlayer Physical Properties:
 - 1) Young's Modulus: 43 kpsi, when tested in accordance with ASTM D 5026.
 - 2) Tensile Strength: 5.0 kpsi, when tested in accordance with ASTM D 638.
 - 3) Elongation: 400%, when tested in accordance with ASTM D 638.
 - 4) Flex Modulus: 50 kpsi, when tested in accordance with D 790.
 - 5) Heat Deflection Temperature at 0.46 MPa: 110 deg F, when tested in accordance with D 648.
 - d. Edge Finishing: Ground and polished.
 - e. Sloped Glazing Top Exterior Surface - Basis-of-Design Coating: Self-cleaning coating product Activ by Pilkington Building Products of North America or SunClean by PPG Industries, Inc.
 3. Use heat-strengthened glass for laminating indoor lite of insulating units.
 4. Where fully tempered is required by glass fabricator, for use and size indicated, provide glass that has been tempered by the tong-less horizontal method.
- D. Clear Float Glass: Clear, annealed.
1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
 2. 6 mm minimum thick.
- E. Safety Glass: Clear; fully tempered with horizontal tempering.
1. Comply with 16 CFR 1201 test requirements for Category II.
 2. 6 mm minimum thick.

3. Provide this type of glazing in the locations indicated on the drawings.
- F. Ceramic-Coated Vision Glass: Heat-treated float glass, Condition C; with ceramic enamel applied by silk-screened process; complying with Specification No. 95-1-31 in GANA's Tempering Division's "Engineering Standards Manual" and with other requirements specified.
 1. Glass: Clear float.
 2. Ceramic Coating Color and Pattern: Grey Dot; refer to insulating unit Type G-3 for pattern.
- G. Ceramic-Coated Spandrel Glass: ASTM C 1048, Condition B, Type I, Quality-Q3, and complying with other requirements specified.
 1. Glass: Clear float.
 2. Ceramic Coating Color: As selected by Architect from manufacturer's full range.
 3. Fallout Resistance: Provide spandrel units identical to those passing the fallout-resistance test for spandrel glass specified in ASTM C 1048.

2.3 SEALED INSULATING GLASS UNITS

- A. Manufacturers: Any of the glass manufacturers with fabrication capabilities or fabricator in good standing with glass manufacturer including, but not limited to, one of the following:
 1. JE Berhowitz, L.P.
 2. Oldcastle Glass.
 3. TGI, Inc.
 4. Viracon, Apogee Enterprises, Inc: www.viracon.com.
- B. Sealed Insulating Glass Units: Types as indicated.
 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 2. Edge Seal: Glass to elastomer with supplementary silicone sealant.
 3. Purge interpane space with dry hermetic air.
- C. Insulated Glass Units (Type G-1): Double pane with glass to elastomer edge seal.
 1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
 2. Purge interpane space with dry hermetic air.
 3. Total unit thickness of 1 inch.
 4. Basis-of-Design - Clear Insulating Units: Guardian SunGuard SNX 62/27 or equal or better product of other named manufacturers.
 - a. Overall Unit Thickness and Thickness of Each Lite: 25 and 6.0 mm.
 - b. Interspace Content: Air.
 - c. Outdoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered).
 - d. Indoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered).
 - e. Low-E Coating: Second surface.
 - f. Visible Light Transmittance: 62 percent minimum.
 - g. Winter Nighttime U-Factor: 0.29 or better.
 - h. Summer Daytime U-Factor: 0.27 or better.
 - i. Solar Heat Gain Coefficient: 0.27 maximum.
 - j. Outdoor Visible Reflectance: 11 percent maximum.
- D. Insulating Glass Units (Type G-2): Same as G-1 except provide indoor lite to be ceramic-coated (fourth surface) spandrel glass, ASTM C 1048, Condition B (spandrel glass, one surface ceramic coated), Type I (transparent flat glass), Quality-Q3, and complying with other requirements specified.
 1. Outdoor lite remains Basis-of-Design product with same low-E coating on second surface.
 2. Fallout Resistance: Provide spandrel units identical to those passing the fallout-resistance test for spandrel glass specified in ASTM C 1048.

- E. Insulated Glass Units (Type G-3): Double pane with glass to elastomer edge seal; ceramic fritted lite.
1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
 2. Purge interpane space with dry hermetic air.
 3. Total unit thickness of 1 inch .
 4. Basis-of-Design - Clear Insulating Units with Ceramic Frit: Guardian SunGuard SNX-L 62/34 or equal or better product of other named manufacturers.
 - a. Overall Unit Thickness and Thickness of Each Lite: 25 and 6.0 mm.
 - b. Interspace Content: Air.
 - c. Outdoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered); ceramic frit on second surface.
 - 1) Pattern: 40 percent; 1/8-inch dots.
 - 2) Frit Color: White or Gray as selected through mock-up process.
 - d. Indoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered).
 - e. Low-E Coating: Third surface.
 - f. Visible Light Transmittance: 47 percent minimum.
 - g. Winter Nighttime U-Factor: 0.29 or better.
 - h. Summer Daytime U-Factor: 0.27 or better.
 - i. Solar Heat Gain Coefficient: 0.31 maximum.
 - j. Outdoor Visible Reflectance: 22 percent maximum.
 - k. Light to Solar Gain: 1.53.
- F. Insulated Glass Units (Type G-4): Double pane with glass to elastomer edge seal; ceramic fritted lite.
1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
 2. Purge interpane space with dry hermetic air.
 3. Total unit thickness of 1 inch .
 4. Basis-of-Design - Clear Insulating Units with Ceramic Frit: Guardian SunGuard SNX-L 62/34 or equal or better product of other named manufacturers.
 - a. Overall Unit Thickness and Thickness of Each Lite: 25 and 6.0 mm.
 - b. Interspace Content: Air.
 - c. Outdoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered); ceramic frit on second surface.
 - 1) Pattern: 60 percent holes; 1/8-inch holes.
 - 2) Frit Color: White or Gray as selected through mock-up process.
 - d. Indoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered).
 - e. Low-E Coating: Third surface.
 - f. Visible Light Transmittance: 36 percent minimum.
 - g. Winter Nighttime U-Factor: 0.29 or better.
 - h. Summer Daytime U-Factor: 0.27 or better.
 - i. Solar Heat Gain Coefficient: 0.25 maximum.
 - j. Outdoor Visible Reflectance: 42 percent maximum.
 - k. Light to Solar Gain: 1.46.
- G. Insulating Glass Units (Type G-5): Same as G-3 except provide indoor lite to be laminated glass with translucent interlayer and complying with other requirements specified; translucent interlayer as indicated under 2.2.C.2.a.1.
1. Outdoor lite remains Basis-of-Design product with same low-E coating on third surface.
- H. Sealing System: Dual seal, with primary and secondary sealants as follows:

1. Primary seal shall be extruded polyisobutylene continuously bonded to glass surfaces and desiccant filled metal spacer, including corners.
 2. Minimum width of primary seal shall be 0.125 inch (3.2 mm). Secondary seal shall be General Electric IGS 3723 or Dow Corning 982.
 3. Secondary seal shall completely cover spacer with no gaps or voids, and shall be continuously bonded to both plates of glass.
 4. Where insulating glass is supported by structural silicone, secondary seal shall be designed to transfer specified pressures from outdoor glass to indoor glass.
- I. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
1. Spacer Material: Stainless steel or thermally jacketed stainless steel.
 2. Color: Black.
 3. Desiccant: Molecular sieve or silica gel, or blend of both.
 4. Corner Construction: Manufacturer's standard corner construction.

2.4 FIRE-RATED GLAZING PRODUCTS

- A. Laminated Ceramic Glazing Material: Proprietary Category II safety glazing product in the form of 2 lites of clear ceramic glazing material laminated together to produce a laminated lite of 5/16-inch nominal thickness; polished on both surfaces; weighing 4 lb/sq. ft.; and as follows:
1. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Polished on both surfaces, transparent.
 3. Product: "FireLite Plus" by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products.
- B. Laminated Glass with Intumescent Interlayers:
1. At the Contractor's discretion, transparent wall product may be used instead of ceramic product; transparent wall panel products shall meet performance requirements specified for ceramic product.
 2. Contractor must verify proper glazing stop width and heights for ratings, with the door and frame manufacturers.
 3. Proprietary Category II safety glazing product in the form of multiple lites of Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Kind FT (fully tempered) float glass laminated with intumescent interlayers; and as follows:
 4. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 5. Product: Subject to compliance with requirements, "PyroStop" by Pilkington Building Products North America and distributed by Technical Glass Products.

2.5 GLAZING COMPOUNDS

- A. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
- C. Interior wet-applied sealants and sealant primers: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."

2.6 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products as follows:
 - 1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 - 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
 - 1. Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.
- E. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I; black color.
- F. Glazing Clips: Manufacturer's standard type.

2.7 STANDOFF FITTINGS - INTERIOR DECORATIVE PANELS

- A. Stainless steel Type 316, fixed point fittings anchored to a support frame system; capable of bi-dimensional adjustment.
- B. Provide with countersunk screws for flush surface; interior and exterior.
- C. Bushings to be UV-resistant nylon.
- D. Gaskets will be fully vulcanized fiber, neoprene or pre-cured silicone.
- E. Approved Manufacturers:
 - 1. SADEV Architectural Glass Systems.
 - 2. Pilkington Planar.
 - 3. Oldcastle.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

- C. Prime surfaces scheduled to receive sealant.
 - D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
 - E. Install sealants in accordance with manufacturer's instructions.
- 3.3 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)
- A. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
 - B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
 - C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.
- 3.4 INSTALLATION - EXTERIOR DRY METHOD (TAPE AND GASKET SPLINE GLAZING)
- A. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
 - B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
 - C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
 - D. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
 - E. Trim protruding tape edge.
- 3.5 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)
- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
 - B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
 - C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
 - D. Place glazing tape on free perimeter of glazing in same manner described above.
 - E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
 - F. Knife trim protruding tape.
- 3.6 FIELD QUALITY CONTROL
- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
 - B. Monitor and report installation procedures and unacceptable conditions.
- 3.7 CLEANING
- A. Remove glazing materials from finish surfaces.
 - B. Remove labels after Work is complete.
 - C. Clean glass and adjacent surfaces.

3.8 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION

SECTION 08 83 00 - MIRRORS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Glass mirrors.
- B. Polycarbonate mirrors.

1.2 REFERENCE STANDARDS

- A. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- B. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).
- C. GANA (GM) - GANA Glazing Manual; 2009.
- D. GANA (SM) - GANA Sealant Manual; 2008.
- E. GANA (TIPS) - Mirrors: Handle with Extreme Care (Tips for the Professional on the Care and Handling of Mirrors); 2011.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. VOC Submittal: Provide product data for field-applied mastics indicating VOC content in g/L; comply with limits of Section 01 61 16.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual and GANA (SM) for glazing installation methods.
- B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with recommendations of GANA (TIPS).

1.5 FIELD CONDITIONS

- A. Do not install mirrors when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.
- B. Mirror Glass: ASTM C1036, Type 1 - Transparent Flat, Class 1 - Clear, Quality - Q1 (mirror select); silvering, protective coating, and quality requirements in compliance with ASTM C1503.
 - 1. Thickness: 1/4 inch.
 - 2. Size: As noted on drawings.
- C. Polycarbonate Mirror: ANSI Z97.1; plastic compound, clear; mirrored coating ; manufacturer's standard abrasion resistant coating for scratch resistance.
 - 1. Minimum 48 inch wide sheets; center full width panels on wall area; locations of vertical butt joints to be accepted by Architect prior to installation.
 - 2. Height as indicated on Drawings.
 - 3. Available Product: Polycarbonate Mirror Sheet with ARmadillo coating by Plaskolite, Inc.; www.plaskolite.com.
 - 4. Locations: Dance Studio and where indicated from above base to indicated height.

2.2 ACCESSORIES

- A. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- B. Mirror Adhesive: Silicone pre-polymer based, chemically compatible with mirror coating and wall substrate.
 - 1. Product produced specifically for setting mirrors.
 - 2. Product certified by mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors are installed.
 - 3. Sealants applied within the building waterproofing envelope: Comply with low-emitting requirements.
 - 4. Manufacturers:
 - a. Gunther Mirror Mastics.
 - b. Palmer Products Corporation.
 - c. Bohle.
- C. Top and Bottom Trim: Aluminum extrusions with a return deep enough to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.
 - 1. Bottom Trim: L-bars formed with back leg not less than 7/8 inch (9.5 and 22 mm) in height, and a thickness of not less than 0.05 inch (1.3 mm).
 - a. See Editing Instruction No. 1 in the Evaluations for cautions about naming manufacturers and products. See Section 016000 "Product Requirements."
 - b. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:
 - 1) Laurence, C. R. Co., Inc.; CRL Standard "J" Bar.
 - 2) Product in first subparagraph below is 0.05 inch (1.3 mm) thick.
 - 3) Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Shallow Nose "L" Moulding Lower Bar.
 - 4) Stylmark; L-Molding Lower Bar.

2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch (16 and 25 mm) in height, respectively, and a thickness of not less than 0.062 inch (1.57 mm).
 - a. See Editing Instruction No. 1 in the Evaluations for cautions about naming manufacturers and products. See Section 016000 "Product Requirements."
 - b. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:
 - 1) Laurence, C. R. Co., Inc.; CRL Deep "J" Channel.
 - 2) Product in first subparagraph below is 0.062 inch (1.57 mm) thick.
 - 3) Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Deep Nose "J" Moulding Lower Bar.
 - 4) Stylmark; J-Molding Upper Bar.
- D. Finish: Clear bright anodized.
- E. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

2.3 FABRICATION

- A. Mirror Sizes: To suit Project conditions, cut mirrors to final sizes and shapes.
- B. Cutouts: Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment: Flat polished edge.
 1. Seal edges of mirrors after edge treatment to prevent chemical or atmospheric penetration of glass coating.
- D. Film-Backed Safety Mirrors:
 1. Apply film backing with pressure-sensitive adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections.
 2. Use adhesives and film backing compatible with mirror backing paint as certified by mirror manufacturer.
 3. Provide film backing on all glass mirrors.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.

3.2 INSTALLATION

- A. Install mirrors in accordance with GANA (TIPS) and manufacturers recommendations.
- B. Set mirrors plumb and level, and free of optical distortion.
- C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.
- D. Do not permit edges of mirrors to be exposed to standing water.
- E. Wall-Mounted Mirrors:
 1. Install mirrors with mastic and mirror channels.
 2. Install mirror hardware that are fabricated in single lengths to fit and cover top and bottom edges of mirrors.
 3. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.

- b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch between back of mirrors and mounting surface.
 - 4. Mirror walls in Dance or performance practice areas to be mounted with the best quality workmanship.
 - a. Edges of adjacent panels must be perfectly flush without raised edge.
 - b. Over the entire plane of the wall there cannot be a gap greater than 1/16-inch when testing the surface with a 10-foot straight edge, including panel-to-panel checks.
 - c. The intent is for the reflection to be true without distortion for the full width of the wall.
- 3.3 CLEANING
- A. Remove labels after work is complete.
 - B. Clean mirrors and adjacent surfaces.
- 3.4 PROTECTION
- A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

SECTION 08 91 00 - LOUVERS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Louvers, frames, and accessories.

1.2 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
- B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2012.
- C. AMCA 511 - Certified Ratings Program for Air Control Devices; 2010.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.
- D. Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior and interior surfaces.
- E. Test Reports: Independent agency reports showing compliance with specified performance criteria.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.5 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
 - 1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Airolite Company, LLC: www.airolite.com.
- B. All-Lite Architectural Products: www.alllite.com.
- C. Construction Specialties, Inc; RS-7315 (basis-of-design): www.c-sgroup.com.
- D. Greenheck Fan Corporation: www.greenheck.com.
- E. Industrial Louvers, Inc: www.industriallouvers.com.
- F. Ruskin Company: Model EME720.

2.2 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 - 1. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
 - 2. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
 - 3. Screens: Provide bird screens.
- B. Deep Storm Resistant Fixed Horizontal Louver:
 - 1. Material: Heads, sills, jambs and mullions to be one-piece structural aluminum members with integral caulking slot and retaining beads.
 - 2. Design: Architectural line drainable sightproof storm resistant fixed-blade; designed to collect and drain water to exterior at sill by means of multiple gutters in blades and channels in jambs and mullions.
 - 3. Louvers to be supplied with 4 inches high by full depth sill flashings formed from minimum 0.050 inch thick aluminum; sill flashings to have welded side panels.
 - 4. Frame: 7 inches deep, channel profile; corner joints mitered and welded.
 - 5. AMCA Performance: (48 inches wide by 48 inches high test unit)
 - a. Free Area: Minimum 8.0 sq. ft.
 - b. Intake pressure drop at 900 fpm free area velocity: Minimum 0.32 in. H₂O.
 - c. Exhaust pressure drop at 900 fpm free area velocity: Minimum 0.44 in. H₂O.
 - 6. Wind Driven Rain Performance:
 - a. The louver test based on a 1.00m by 1.00m core area; unit tested at a rainfall rate of 3.0 inches per hour and with a wind directed to the face of the louver at a velocity 29.1-mph.
 - b. The test data to show the water penetration effectiveness rating at each corresponding ventilation rate.

2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Polyvinylidene Fluoride Coating: Minimum 70 percent Kynar 500/Hylar 500 resin, three coat finish, complying with AAMA 2605.
 - 1. Color: Custom, to match approved sample.

2.4 ACCESSORIES

- A. Blank-Off Panels: Same material as louver, painted black on exterior side.
 - 1. Provide where indicated and where duct connected to louver is smaller than louver frame, sealing off louver area outside duct.
 - 2. Uninsulated Panels: Provide at unconditioned spaces; minimum 0.050 inch thick aluminum sheet.
 - 3. Insulated Panels: Provide at conditioned spaces or where indicated.
 - a. 1 inch thick and faced on both sides with minimum 0.032 inch thick aluminum sheet.
 - b. Fabricated with an expanded polystyrene (EPS) core.
 - c. Panel perimeter frame to be 0.050 inch thick-formed aluminum channels; panel frame mitered at the corners.
 - 4. Finish: Same quality as louvers.
- B. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.

1. Bird screens to be minimum 5/8 inch mesh, 0.050 inch thick expanded and flattened aluminum bird screen secured within minimum 0.055 inch thick extruded aluminum frames; frames to have mitered corners and corner locks.
- C. Glazing Adapter: Provide where louvers are glazed into storefront or curtainwall frames; minimum 0.090 inch thick extruded aluminum.
- D. Fasteners and Anchors: Stainless steel.
- E. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
- F. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.
- G. Other Sealant: Section 07 92 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.
- B. Verify that field measurements are as indicated.

3.2 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louver frames in openings with concealed fasteners.
- E. Install perimeter sealant and backing rod in accordance with Section 07 92 00.

3.3 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

SECTION 09 21 16 - GYPSUM BOARD ASSEMBLIES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Shaft wall system.
- C. Fire rated area separation walls.
- D. Acoustic insulation.
- E. Gypsum sheathing.
- F. Gypsum wallboard.
- G. Glass mat faced gypsum board.
- H. Moisture and mold resistant wallboard.
- I. Impact-resistant gypsum board.
- J. Joint treatment and accessories.
- K. Finishing interior concrete surfaces.

1.2 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- C. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- D. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- E. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing Board; 2013.
- F. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014a.
- G. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2015.
- H. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- I. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- J. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- K. GA-216 - Application and Finishing of Gypsum Board; 2013.
- L. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2008.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- C. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

- D. LEED Submittals: Comply with Section 018113.
1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For gypsum board and steel framing: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content gypsum board and steel framing: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For regionally sourced gypsum board and steel framing: Documentation indicating locations of recovery, manufacture, purchase of recycled raw materials.
 - c. For manufacturers with extended producer responsibility programs: Documentation describing the program and confirmation that product is included in the program.
 3. MR Credit 4: BPDO - Material Ingredients
 - a. For gypsum board, sound attenuation blanket, joint compound, if available: Material Ingredient Report.
 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives and sealants: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
- E. Submit drawings indicating proposed location of control joints for Architect's review; locations to be approved by Architect and may be adjusted for aesthetic reasons.

1.4 QUALITY ASSURANCE

- A. Maintain one copy of all installation standards at project site.
- B. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
 1. Maintain one copy of standards at project site.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
 1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire Rated Assemblies: Provide completed assemblies identical to those tested in assembly indicated.

2.2 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 1. CertainTeed Corporation: www.certainteed.com.
 2. Continental Building Products: www.continental-bp.com.
 3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
 4. Lafarge North America: www.lafarge.com.
 5. National Gypsum Company: www.nationalgypsum.com.
 6. USG Corporation: www.usg.com.

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- B. 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. Edges: Tapered.
 - c. Recycled Content: Provide regular type gypsum panel products with minimum 80 percent recycled content, including recycled content face paper; provide Type X with minimum 10 percent recycled content.
 2. Fire Resistant Type: Complying with Type X requirements; UL or WH rated.
 - a. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
 - b. Edges: Tapered.
 3. Ceiling Board: Special sag-resistant type.
 - a. Application: Ceilings, except areas with showers or otherwise indicated.
 - b. Thickness: 1/2 inch.
 - c. Edges: Tapered.
- C. Impact Resistant Wallboard:
1. Application: Shaft-wall assemblies and where Drawings indicate impact- or abuse-resistant gypsum wallboard.
 2. Surface Abrasion: 2, minimum, when tested in accordance with ASTM C1629/C1629M.
 3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
 4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
 5. Hard Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
 6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 7. Type: Fire resistance rated Type X, UL or WH listed.
 8. Thickness: 5/8 inch.
 9. Edges: Tapered.
 10. Products:
 - a. Continental Building Products; Protecta HIR 300 Type X with Mold Defense.
 - b. Georgia-Pacific Gypsum; DensArmor Plus Impact-Resistant.
 - c. National Gypsum Company; Gold Bond HI-Impact XP Gypsum Board.
 - d. National Gypsum Company; Gold Bond eXP Interior Extreme IR Gypsum Panel.
- D. Moisture and Mold Resistant Wallboard: Wallboard installed at building perimeter, and any wallboard furred to concrete or masonry construction.
1. Characteristics:
 - a. ASTM C 1396 (Section 5) regular type except where Type X fire-resistant type is indicated or required by to meet UL assembly types.
 - b. Edges: Tapered.
 - c. Resists the growth of mold when tested, as manufactured, according to ASTM D 3273.
 2. Available Products:
 - a. SHEETROCK® Brand Mold Tough® Gypsum Panels by USG.
 - b. Gold Bond® BRAND XP® Wallboard by National Gypsum.
 - c. Mold Defense Products by LaFarge.

2.3 FIBERGLASS REINFORCED BOARD MATERIALS

- A. Glass Mat Gypsum Board: Gypsum panels with moisture-resistant core and coated inorganic fiberglass mat back surface designed to resist growth of mold and mildew, per ASTM D 3273.
1. Glass Mat Board: Comply with performance requirements of ASTM C 1396/C 1396M for water-resistant gypsum backing board and ASTM C 1177/C 1177M for sheathing; tapered long edges.
 2. Application: High-humidity or wet locations; walls or ceilings; high-humidity or wet locations include kitchen areas and adjacent service areas, areas with showers, janitor basins, gang toilets, mechanical penthouses and mechanical spaces with steam, hot water or condensation generating equipment.
 - a. Available Products:
 - 1) DensArmor Plus Interior Guard by G-P Gypsum.
 - 2) EXP Extreme by National Gypsum.
 3. Application: Sheathing.
 - a. Basis-of-Design: Dens-Glass Gold Exterior Guard by G-P Gypsum; Type X.
 - b. Other Available Products: CertainTeed GlasRoc Brand Sheathing; Type X, e2xp Extended Exposure Sheathing by National Gypsum Company.
 4. Application: Shaftwall.
 - a. Basis-of-Design: Dens-Glass Ultra Shaft Guard by G-P Gypsum.
 - b. Contractor Option: The contractor may provide the following instead of Basis-of-Design Product.
 - 1) Fire-Shield Shaftliner XP panels by National Gypsum.
 - 2) Sheetrock Brand Gypsum Liner Panels Mold Tough by USG.
 5. Application: Exterior soffits.
 - a. Available Products:
 - 1) Dens-Glass Gold Exterior Guard by G-P Gypsum.
 - 2) CertainTeed GlasRoc Brand Sheathing.
 - b. Core: 5/8 inch, Type X.
 - c. Finish: G-P Setting Compound followed by G-P Finish Coat.

B. Sheathing Joint and Penetration Treatment:

 1. Silicone Emulsion Sealant: ASTM C 834, compatible with sheathing tape and sheathing, recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

2.4 ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.
- B. Thickness as scheduled by partition schedule by dimension or STC assembly.
- C. Acoustic Insulation: 1; preformed glass fiber, friction fit type, unfaced.
- D. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
1. Comply with low-emitting requirements specified in Section 01 81 13.
- E. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
1. Types: As detailed or required for finished appearance.
 2. Available products include the following:
 - a. Grabber Construction Products: No-Coat Prefinished Corners.
 - b. US Gypsum Company; Beadex Paper-Faced Metal Drywall Bead and Trim.
 - c. Clark Dietrich; Platinum Paper-Faced Metal Drywall Bead and Trim.

- F. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Joint Tape: Paper for interior applications; 10-by-10 glass mesh for exterior locations and glass mat gypsum wallboard; 2 inch wide.
 - 2. Ready-mixed vinyl-based joint compound.
- G. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
- H. Screws: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.
- I. Adhesives Applied within the Building Waterproofing Envelope: Comply with low-emitting requirements.
- J. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
 - 1. 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:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 - 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
 - 3. Finish:
 - a. Corrosion-resistant primer compatible with joint compound and finish materials specified.
 - b. Silicone polyester enamel finish coat; custom color to be selected.
 - 4. Reveals, Trims and Molding: As indicated on Drawings.

2.5 FINISHING INTERIOR CONCRETE SURFACES

- A. Filling Compound Product - Basis-of-Design: USG Sheetrock Brand Cover Coat Compound.
- B. Other Available Products:
 - 1. Mapei; Tilt Finish.
 - 2. National Gypsum; Pro-Form Concrete Cover Compound.
- C. Locations: Exposed to the public surfaces indicated for painting; does not include self-consolidating concrete to receive penetrating sealer and graffiti-resistant coating.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 SHAFT WALL INSTALLATION

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
 - 1. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

3.3 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.4 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, 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.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
 - 1. Cut boards at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
 - a. Install boards with a 3/8-inch setback where non-load-bearing construction abuts structural elements.
 - b. Install boards with a 1/4-inch setback where they abut masonry or similar materials that might retain moisture, to prevent wicking.
 - 2. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed exterior wall assembly.
 - 3. Apply fasteners so screw heads bear tightly against face of sheathing boards but do not cut into facing.
 - 4. Do not bridge building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.
 - 5. Screw-attach boards at perimeter and within field of board to each steel stud; space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
 - 6. Seal sheathing joints according to sheathing manufacturer's written recommendations.
 - a. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing board joints, and apply and trowel silicone emulsion sealant to embed sealant in entire face of tape.
 - b. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered.
 - c. Seal other penetrations and openings.
- F. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
 - 1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
 - 2. Fasten with corrosion-resistant screws.
 - 3. Apply glass-fiber tape to glass mat faced gypsum board joints, and apply and trowel silicone emulsion sealant to embed sealant in entire face of tape.
 - 4. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered.
 - 5. Seal other penetrations and openings.
 - 6. Prepare for specified finish according to manufacturer's instructions.
- G. Glass Mat Faced Gypsum Board: Install in strict accordance with manufacturer's instructions.

- H. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.
- I. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.5 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
 - 2. At exterior soffits, not more than 30 feet apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

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, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 5: Walls and ceilings to receive wall covering, semi-gloss or gloss paint finish and other areas specifically indicated; areas to receive murals, graphics or graphic films; areas to receive porcelain marker wall.
 - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 4. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
 - 5. Level 0: Temporary partitions.
- 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.
- D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.7 FINISHING INTERIOR CONCRETE SURFACES

- A. Apply and finish compound as indicated by the manufacturer.
- B. Apply minimum 3 coats until surface provides smooth paint-ready surface.

3.8 TOLERANCES

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

END OF SECTION

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Metal partition, ceiling, interior soffit and bulkhead framing.
- B. Framing accessories.

1.2 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- B. 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)
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
- F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
 - 2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.
- C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, limitations, and head to structure connectors, showing compliance with requirements.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For gypsum board and steel framing: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content steel framing and suspension systems: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.

- b. For regionally sourced steel framing: Documentation indicating locations of recovery, manufacture, purchase of recycled raw materials.
- 3. MR Credit 4: BPDO - Material Ingredients
 - a. For steel framing and suspension systems, if available: Material Ingredient Report.

1.4 PROJECT CONDITIONS

- A. Coordinate the placement of components to be installed within stud framing system.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Framing, Connectors, and Accessories:
 - 1. Clarkwestern Dietrich Building Systems LLC: www.clarkdeitrich.com.
 - 2. Dietrich Metal Framing: www.dietrichindustries.com.
 - 3. Marino: www.marinoware.com.
- B. Slip-Type Head Joints:
 - 1. Steel Network Inc. (The); VertiClip SLD or VertiTrack VTD Series.
 - 2. Superior Metal Trim; Superior Flex Track System (SFT).
 - 3. Dietrich Metal Framing; Fast Top Clip.
- C. Firestop Tracks:
 - 1. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
 - 2. Metal-Lite, Inc.; The System.
 - 3. Clark Western; Brady's Sliptrack within UL assembly.
 - 4. Dietrich Metal Framing; SLP-TRK within UL assembly.
- D. Metal Back-up Plates:
 - 1. Metal Lite, Inc.; Product Flush Mount or Notch-Tite.
 - 2. Bailey Metal Products Limited; Product Bailey Backer Bar.
- E. Grid Suspension System for Gypsum Board Ceilings and Bulkheads:
 - 1. Armstrong World Industries, Inc.; Drywall Grid Systems.
 - 2. Chicago Metallic Corporation; Drywall Furring System.
 - 3. USG Corporation; Drywall Suspension System.

2.2 FRAMING MATERIALS

- A. Recycled Content: Provide steel with at least 25 percent post-consumer recycled content.
- B. Regional Materials: Provide at least 25 percent of steel manufactured and containing recycled raw materials recovered within 100 mile radius of Project Site.
- C. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated
 - 1. Design Values:
 - a. Deflection Limit: Design framing systems to withstand design loads without deflections greater than the following:
 - 1) $L/240$ unless otherwise noted.
 - 2) $L/360$ where Level 5 gypsum board finish is indicated, at tile backing panels, where plaster veneer is indicated, and elsewhere as indicated.
 - b. Lateral Pressure:
 - 1) 5.0 psf (240 Pa) unless otherwise noted.

- 2) 7.5 psf (360 Pa) at all shaft enclosures penetrating one or more floors, elevator enclosures, pressurized plenums, entrance lobbies and vestibules with automatic entrances, and elsewhere as noted.
- 3) 10 psf (480 Pa) at stair enclosures.
2. Design of metal back-up plate selections and framing reinforcement for imposed loading to be included in delegated design responsibilities; design loading specified in this Section.
3. Design of supplemental framing reinforcement for counter support bracket attachment and loading to be included in delegated design; counter support bracket as specified in Division 6 Section, Interior Architectural Woodwork.
 - a. Load Capacity: 450 pounds per bracket minimum.
- D. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- E. Loadbearing Studs: As specified in Section 05 40 00.
- F. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- G. 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 S100-12.
 2. Material: ASTM A653/A653M steel sheet, SS Grade 50, with G60/Z180 hot dipped galvanized coating.
 3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.
 4. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.
- H. Tracks and Runners: Same material and thickness as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud.
- I. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C754.
- J. Fasteners: ASTM C1002 self-piercing tapping screws.
- K. Sheet Metal Backing: 0.036 inch thick, galvanized.
- L. Anchorage Devices: Power actuated.
- M. Metal Back-Up Plates and Monitor Mounting Plates: Minimum thickness of 0.0538 inch galvanized steel plates of sizes and configurations detailed, or if not detailed, as required to accommodate the wall hung casework, millwork, railings or other items mounted to metal stud and wallboard walls and partitions.
 1. Provide plates designed, and certified, to support an imposed load of 500 lbs. per linear foot for handrails, grab bars and other ADA-compliant items; components identified as bariatric use to support an imposed load of 1000 lbs. per linear foot. Provide plates designed, and certified, to support an imposed load of 144 lbs. per linear foot for all other items. All loads required above are in addition to the weight of the item supported by the back-up plate.
 2. Metal back-up plate selections and framing reinforcement for imposed loading to be included in delegated design responsibilities.
- N. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.

- O. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
 - 1. Comply with low-emitting requirements specified in Section 01 81 13.
- P. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

2.3 FABRICATION

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

PART 3 EXECUTION

3.1 INSTALLATION OF STUD FRAMING

- A. Comply with requirements of ASTM C754.
- B. Extend partition framing to structure where indicated and to ceiling in other locations.
- C. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- D. 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.
- E. Align and secure top and bottom runners at 24 inches on center.
- F. Place one bead of acoustic sealant between runners and substrate, studs and adjacent construction.
- G. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- H. Install studs vertically at spacing indicated on drawings.
- I. Align stud web openings horizontally.
- J. Secure studs to tracks using crimping method. Do not weld.
- K. Stud splicing is not permissible.
- L. Fabricate corners using a minimum of three studs.
- M. Double stud at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- N. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- O. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- P. Provide metal backup plates as required to accommodate the wall hung casework, millwork, railings or other items mounted to metal stud and wallboard walls and partitions; provide plates up to 8 feet in length as one-piece units.

3.2 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 30 00 - TILING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Tile for shower receptors.
- D. Tile base for polished concrete floor finish.
- E. Cementitious backer board as tile substrate.
- F. Coated glass mat backer board as tile substrate.
- G. Stone thresholds.
- H. Trims.
- I. Waterproofing and crack isolation membrane.

1.2 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2017.
- B. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2013.1.
 - 1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2014.
 - 2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
 - 3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement; 1999 (Reaffirmed 2010).
 - 4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).
 - 5. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
 - 6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (Reaffirmed 2010).
 - 7. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2010).
 - 8. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).
 - 9. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).
 - 10. ANSI A108.11-SystemDeleted - American National Standard for Interior Installation of Cementitious Backer Units; 2010 (Revised).

11. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior glue plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
 12. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2010).
 13. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).
 14. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Revised).
 15. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2016).
 16. ANSI A118.9-SystemDeleted - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2010).
 17. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2013.1.
- C. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2015.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- G. Product data for Credit IEQ 4.2: For sealers applied within the building water proofing envelope, documentation including printed statement of VOC content in g/L.
- H. LEED Submittals: Comply with Section 018113.
 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For tile and grout, if available: Industry-wide or product-specific EPD.
 2. MR Credit 4: BPDO - Material Ingredients
 - a. For grout, cement board, and waterproofing membrane, if available: Material Ingredient Report.
 3. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesive, grout, grout sealer, sealants, primers: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
 - b. For interior wet-applied waterproofing membrane: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010.

1.4 QUALITY ASSURANCE

- A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.

1.5 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.7 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

1.8 EXTRA MATERIALS

- A. Extra Tile: 2 percent of each size, color, and surface finish combination, but not less than one box of each type.
- B. Turn over any cut tile exceeding 50 percent of a full tile, as extra materials.

PART 2 PRODUCTS

2.1 TILE

- A. Glazed Wall Tile Type 1:
 - 1. Size and Shape: 3-inch x 12-inch or 4-inch x 12-inch.
 - 2. Edges: Cushioned.
 - 3. Surface Finish: Gloss, unless specifically noted to be Matte Finish; hand-mold aesthetic..
 - 4. Colors: Maximum 3 colors. As selected from manufacturer's full product line including all price groups. A maximum 50 percent of wall tile will be selected from the highest price group.
 - 5. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile.
 - 6. Basis of Design: Ceramic Technics, Ltd; Product Studio Elements Handmold.
 - 7. Available Manufacturers: Subject to approval of aesthetic effect.
 - a. Marrazzi; Product Middleton Square (Basis-of-Design).
 - b. Interceramic, USA.
 - c. Pamarva Marlow, distributed by Conestoga Tile.
- B. Glazed Wall Tile Type 2: ANSI A137.1, and as follows:
 - 1. Moisture Absorption: 3.0 to 7.0 percent.
 - 2. Size and Shape: 4-inch or 6-inch square as directed by Architect; expect a 50/50 division of total quantity.
 - 3. Edges: Cushioned.
 - 4. Surface Finish: Semi-gloss, unless specifically noted to be Matte Finish.
 - 5. Colors: Maximum 10 colors. As selected from manufacturer's full product line including all price groups.
 - 6. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile.
 - 7. Basis of Design: Artaic; Product Terraferma.
 - 8. Available Manufacturers: Subject to approval of aesthetic effect.
 - a. Daltile Corporation.
 - b. American Olean.
 - c. Interceramic, USA.
 - d. Mosa.

- C. Ceramic Mosaic Tile: Same product line as Glazed Wall Type 2; indicated areas and wall mural art.
1. Size and Shape: 1 inch square.
 2. Edges: Square.
 3. Surface Finish: Gloss glaze.
 4. Colors: To be selected by Architect from manufacturer's full range.
- D. Glazed Wall Tile Type 3 - Subway Tile: ANSI A137.1, and as follows:
1. Size and Shape: 3- X 6 inch.
 2. Edges: Cushioned.
 3. Surface Finish: Semi-gloss and Matte; running bond pattern to be provided by Architect using an estimated 70 percent Semi-Gloss and 30 percent Matte finished tile.
 4. Colors: As selected from manufacturer's standard product line.
 5. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile.
 6. Basis of Design: Daltile Rittenhouse Square; or equivalent product of other manufacturers named in this section.
- E. Large Format Porcelain Tile Panels: ANSI A137.1, and as follows:
1. Basis-of-Design: Ceramic Technics Ltd.; Product Studio Art Natural Bamboo.
 2. Bending Strength: ISO 10545-4 35N/mm² or better.
 3. Resistance to Abrasion: ISO 10545-7 Class 4 (PEI) or better.
 4. Size and Shape: 6 inches x 36 inches and 9 inches x 36 inches; rectified.
 5. Face: Wood look appearance.
 6. Edges: Square.
 7. Resistance to Stain: ISO 10545-14 Class 5 or better.
 8. Surface Finish: Unglazed; DCOF ANSI A 137.1 Average 5.6 Wet.
 9. Colors: To be selected by Architect from manufacturer's full range.
- F. Large Format Porcelain Tile Accessories - Base for Polished Concrete Floor Finish:
1. Basis-of-Design: Marazzi USA; SystemN Neutrals Trim; or equivalent of other named manufacturers within this section, subject to comparison with Basis-of-Design and availability of color, finish, and inside- outside- trim components.
 2. Size: 24-inch length; 3-inch height for bullnose top (no tile above) or height indicated with square edge (with tile above).
- G. Quarry Tile: ANSI A137.1, and as follows:
1. Moisture Absorption: 0.5 to 3.0 percent.
 2. Size and Shape: 8 inch square.
 3. Thickness: 3/4 inch.
 4. Edges: Square.
 5. Surface Finish: Unglazed.
 6. Colors: To be selected by Architect from manufacturer's full range including all price groups. A maximum 50 percent of floor tile will be selected from the highest price group.
 7. Trim Units: Matching cove base shapes in sizes coordinated with field tile.

2.2 TRIM AND ACCESSORIES

- A. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
1. Applications:
 - a. Open Edges: Bullnose.
 - b. Inside Corners: Jointed.

- c. Floor to Wall Joints: Cove base.
2. Manufacturers: Same as for tile.
- B. Thresholds: Marble, white or graygray, honed finish; 5 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.
 1. Applications:
 - a. At doorways where tile terminates, unless indicated otherwise.
 - b. At open edge of shower stalls using tile as basin.

2.3 SETTING MATERIALS

- A. Latex-Portland Cement Mortar Bond Coat - Thin Set and Medium Bed: ANSI A118.4.
 1. Products:
 - a. ARDEX Engineered Cements: www.ardexamericas.com
 - b. Custom Building Products: www.custombuildingproducts.com.
 - c. Bonsal American, Inc: www.sakrete.com.
 - d. Bostik Inc: www.bostik-us.com.
 - e. MAPEI Corporation.
 - f. TEC Specialty Products, Inc.
 2. Medium Bed Locations: Where required to produce slope; product that is approved by manufacturer for application thickness of 5/8 inch (16 mm).

2.4 GROUTS

- A. Manufacturers:
 1. ARDEX Engineered Cements: www.ardexamericas.com.
 2. Bonsal American, Inc: www.sakrete.com
 3. Bostik Inc: www.bostik-us.com/#sle.
 4. Custom Building Products: www.custombuildingproducts.com/#sle.
 5. LATICRETE International, Inc: www.laticrete.com/#sle.
 6. TEC, an H.B. Fuller Construction Products Brand: www.tecspecialty.com/#sle.
 7. Custom Building Products: www.custombuildingproducts.com.
 8. MAPEI Corporation.
- B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 3. Colors: As selected by Architect from manufacturer's full line.

2.5 ACCESSORY MATERIALS

- A. Adhesives, grout, grout sealer, sealants, waterproofing membrane, and primers applied within the building waterproofing envelope: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
- B. Waterproofing and Crack Isolation Membrane: Fluid-applied acrylic-based membrane with reinforcing mesh, complying with ANSI A118.10.
 1. Basis-of-Design: Mapei Corporation; Mapelastic HPG with Fiberglass Mesh.
 2. Equivalent product of listed setting and grouting material manufacturers.
 3. Location: All tile floors; full coverage.

- C. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
1. Product: Durock Brand Cement Board manufactured by United States Gypsum Company.
 - a. Contractor Option: PermaBase Brand Cement Board, by National Gypsum Company.
 2. Location: Wet walls and high-humidity areas (not required at corridor locations).
- D. Tile Backer Panel:
1. Mold-resistance: Passes ASTM D 3273.
 2. Compliance with Standards: Meets ASTM C 1278 and meets or exceeds the physical requirements of ASTM C 630 and ASTM c 1178.
 3. Use: Approved by manufacturer for use as tile backer panel.
 4. No paper face.
 5. Basis-of-Design: Fiberock Brand Aqua-Tough Interior Panel manufactured by United States Gypsum Company.
 6. Contractor Option: DensShield Tile Backer manufactured by Georgia-Pacific or e2xp Tile Baker, by National Gypsum Company.
 7. Location: Walls not requiring cementitious backer board as specified.
- E. Metal Edge Strips:
1. Open Edge of Tile with Adjacent Finish of Similar Height:
 - a. General: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.
 - b. Basis-of-Design: 1.1 Schluter-SCHIENE Edge-protecting Profile; stainless steel.
 2. Open Edge of Tile with Adjacent Finish of Different Height:
 - a. General: ADA-compliant profile, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.
 - b. Basis-of-Design: 1.2 Schluter-RENO-U Reducer Profile, where tile surface is higher than adjacent finish; stainless steel.
 3. Open Edge of Tile - Vertical Outside Corners (Walls):
 - a. Basis-of-Design: 2.3 Schluter-Jolly; brushed nickel anodized aluminum.
- F. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.
1. Not required for locations indicated to receive water-cleanable epoxy grout.
 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Bonsal American; an Oldcastle company; Grout Sealer.
 - b. Custom Building Products; Sealer.
 - c. MAPEI Corporation; KER 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
 - d. Merkrete/Parex USA, Inc.; Merkrete Grout Sealer: www.merkrete.com.
 - e. TEC; a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.
 3. Grout sealers shall comply with requirements of FloorScore certification.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
- D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.

3.3 INSTALLATION - GENERAL

- A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install thresholds where indicated.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- K. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated. Seal grout joints.
- L. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.
- M. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 INSTALLATION - FLOORS - THIN-SET AND MEDIUM BED METHODS

- A. Provide specified waterproofing and crack isolation membrane for all tile floor areas; install in accordance with TCA Method F122, with latex-portland cement grout.

3.5 INSTALLATION - FLOORS - MORTAR BED METHODS

- A. Freezer/Cooler Quarry Tile - Thick Set with Reinforcement and Waterproofing: Install by conventional bed TCA Handbook Method F121; epoxy grout.
- B. Mortar Bed Thickness: 5/8 inch, unless otherwise indicated.

3.6 INSTALLATION - SHOWERS AND BATHTUB WALLS

- A. At tiled shower receptors install in accordance with The Tile Council of North America Handbook Method B415, mortar bed floor, and W244, thin-set over cementitious backer unit walls. Latex-Portland cement mortar bond coat with latex-Portland cement grout. Waterproof membrane turned up walls a minimum of 6 inches above finished floor.

3.7 INSTALLATION - WALL TILE

- A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244, using membrane at toilet rooms.
- B. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat.
- C. Shower Walls:
 - 1. Over interior concrete and masonry install in accordance with TCA Handbook Method W211, bonded mortar bed with latex-Portland cement bond coat; with latex-Portland cement grout.
 - 2. Include waterproofing membrane over mortar bed of W211.

3.8 CLEANING

- A. Clean tile and grout surfaces.

3.9 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.
- B. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
- C. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

SECTION 09 51 00 - ACOUSTICAL CEILINGS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Acoustical units.

1.2 REFERENCE STANDARDS

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- C. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items; show the following:
 - 1. Ceiling suspension system members.
 - 2. Method of attaching suspension system hangers to building structure.
 - 3. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
 - 4. Minimum Drawing Scale: 1/8 inch = 1 ft.
- C. Product Data: Provide data on suspension system components.
- D. Samples: Submit two full size samples illustrating material and finish of acoustical units.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For acoustical ceiling panels and steel suspension system: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For bio-based acoustic ceiling panels: Documentation indicating percentage by weight of bio-based content. Include material cost value.
 - b. For recycled content acoustical ceiling panels and steel suspension system: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - c. For manufacturers with extended producer responsibility programs: Documentation describing the program and confirmation that product is included in the program.
 - 3. MR Credit 4: BPDO - Material Ingredients
 - a. For acoustical ceiling panels and steel suspension system: Material Ingredient Report.
 - 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied acoustical sealants: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
 - b. For acoustical ceiling panels: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 or GREENGUARD Gold certification.

1.4 QUALITY ASSURANCE

- A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL (FRD) for the fire resistance indicated.

1.5 FIELD CONDITIONS

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

1.6 PROJECT CONDITIONS

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

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 describing contents.
 - 1. Acoustical Ceiling Units: Full-size units equal to 12 cases.
 - 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com. - Basis-of-Design.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. USG: www.usg.com.
 - 4. Rockfon: www.rockfon.com.
- B. General:
 - 1. Recycled Content: Provide acoustical ceiling panels with minimum 50 percent recycled content; provide steel with minimum 25 percent post-consumer recycled content.
 - 2. Acoustical sealants: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
 - 3. Acoustical ceiling panels: Comply with California Department of Public Health (CDPH) Standard Method v1.1-2010 or GREENGUARD Gold certification.
- C. Acoustical Units - General: ASTM E1264, Class A.
 - 1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistive assembly as part of suspension system.

2.2 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. Chicago Metallic Corporation: www.chicagometallic.com.
 - 4. USG: www.usg.com.
- B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

- C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.

2.3 EXTRUDED PERIMETER TRIM

A. Manufacturers:

1. Armstrong World Industries, Inc; Product Axiom: www.armstrong.com.
2. Chicago Metallic Corporation; Product Infinity: www.chicagometallic.com.
3. USG; Product Compasso: www.usg.com.
4. CertainTeed Ceilings, Product Cloud Perimeter Trim.
5. Gordon Incorporated; Product Contura Perimeter Trims: www.gordon-inc.com.
6. Pittcon Industries; Product PT Series: www.pittconindustries.com.

B. Location:

1. Edge trim system for transitions between drywall and suspended ceilings.
2. Boundry trim system for isolated hung areas of suspended ceilings.

C. Components:

1. Extruded aluminum alloy 6063 trim channel.
2. Attachment to grid system is provided by tee-bar connection clips which lock into bosses on the trim channel and are screw-attached to the web of the intersecting suspension system members.
3. Sections of trim are joined together using the splice plate.

2.4 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

- I. Do not eccentrically load system or induce rotation of runners.
- J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Install in bed of acoustical sealant.
 - 2. Use longest practical lengths.
 - 3. Overlap and rivet corners.
- K. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

3.2 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units with pattern parallel to longest room axis.
- D. Fit border trim neatly against abutting surfaces.
- E. Install units after above-ceiling work is complete.
- F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- G. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.
- H. Where round obstructions occur, provide preformed closures to match perimeter molding.
- I. Install hold-down clips on panels within 20 ft of an exterior door.

3.3 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.4 SCHEDULE

- A. Acoustical Panel Type APC:
 - 1. Product: "Ultima", item #1913 as manufactured by Armstrong World Industries, Inc.
 - 2. Classification: ASTM E1264 - Type IV, Form 2, Pattern E
 - 3. Material: Wet-formed mineral fiber with DuraBrite acoustically transparent membrane
 - 4. Finish: DuraBrite with factory-applied latex paint
 - 5. Color: White
 - 6. Light Reflectance LR: Not less than 0.90
 - 7. Noise Reductions Coefficient NRC: Not less than 0.75
 - 8. Ceiling Attenuation Coefficient CAC: Not less than 35
 - 9. Flame Spread: Class A
 - 10. Dimensional Stability: HumiGuard Plus
 - 11. Antimicrobial Protection: BioBlock Plus - resistance against the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria
 - 12. Edge detail: Square lay-in for interface with Prelude XL 15/16" suspension system
 - 13. Thickness: 3/4 inch
 - 14. Size: 24 by 48 inches
 - 15. Suspension System: Prelude XL 15/16" Exposed Tee Grid System, color white

- B. Acoustical Panel Type APC-2:
1. Product: "Ultima", item #1910 as manufactured by Armstrong World Industries, Inc.
 2. Classification: ASTM E1264 - Type IV, Form 2, Pattern E
 3. Material: Wet-formed mineral fiber with DuraBrite acoustically transparent membrane
 4. Finish: DuraBrite with factory-applied latex paint
 5. Color: White
 6. Light Reflectance LR: Not less than 0.90
 7. Noise Reductions Coefficient NRC: Not less than 0.75
 8. Ceiling Attenuation Coefficient CAC: Not less than 35
 9. Flame Spread: Class A
 10. Dimensional Stability: HumiGuard Plus
 11. Antimicrobial Protection: BioBlock Plus - resistance against the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria
 12. Edge detail: Square lay-in for interface with Prelude XL 15/16" suspension system
 13. Thickness: 3/4 inch
 14. Size: 24 by 24 inches
 15. Suspension System: Prelude XL 15/16" Exposed Tee Grid System, color white
- C. Acoustical Panel Type APC-3:
1. Product: "Calla" item #2824 as manufactured by Armstrong World Industries, Inc.
 2. Classification: ASTM E1264 - Type IV, Form 2, Pattern E
 3. Material: Wet-formed mineral fiber with acoustically transparent membrane
 4. Finish: Acoustically transparent membrane with factory-applied latex paint
 5. Color: White and colors (as noted on the drawings)
 6. Light Reflectance LR: Not less than 0.86
 7. Noise Reductions Coefficient NRC: Not less than 0.85
 8. Ceiling Attenuation Coefficient CAC: Not less than 35
 9. Articulation Class AC: Not less than 170
 10. Flame Spread: Class A
 11. Dimensional Stability: HumiGuard Plus
 12. Antimicrobial Protection: BioBlock Plus - resistance against the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria
 13. Edge detail: Square tegular for interface with Suprafine XL 9/16" suspension system
 14. Thickness: 1 inch
 15. Size: 24 by 24 inches
 16. Suspension System: Suprafine XL 9/16" exposed tee grid system, color white and color (to match ceiling panel)
 17. Trim: Axiom Classic 4" curved, item #AX4CUR, color white and color (to match ceiling panel and grid)
- D. Acoustical Panel Type APC-4:
1. Product: Basis of Design: "Calla Shapes for DesignFlex" Pattern #37, Item #100108 as manufactured by Armstrong World Industries, Inc.
 2. Classification: Type IV, Form 2, Pattern E
 3. Material: Wet-formed mineral fiber with acoustically transparent membrane
 4. Finish: Acoustically transparent membrane with factory-applied latex paint
 5. Color: White and colors (as noted on drawings)
 6. Light Reflectance LR: Not less than 0.86 (white only)
 7. Noise Reductions Coefficient NRC: Not less than 0.80
 8. Ceiling Attenuation Coefficient CAC: Not less than 35

9. Flame Spread: Class A
10. Dimensional Stability: HumiGuard Plus
11. Edge: Square tegular
12. Thickness: 1 inch
13. Modular Size: 45 Degree 48 inch Base Right Triangle (48 by 48 inches)
14. Antimicrobial Protection: BioBlock Plus - resistance against the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria
15. Suspension System: Suprafine XL 9/16" exposed tee grid system, color white

END OF SECTION

SECTION 09 51 23 - ACOUSTICAL CLOUDS**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes the Acoustic Finishes as shown and specified in the described systems:
 - 1. Feature acoustical clouds.
 - 2. Suspended panel acoustical clouds

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data; include product description, fabrication information, and compliance with specified performance requirements.
- B. Submit product test reports from a qualified independent third party testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed test reports will be acceptable if for current manufacturer and indicative of products used on this project.
 - 1. Test reports required are:
 - a. Steiner Tunnel Surface Burning Rate Test (ASTM E 84)
 - b. ASTM C423
 - c. Dynamic environmental testing (ASTM standards D 5116 and D 6670)
- C. Shop Drawings: Include plans, elevations, sections, panel dimensions, details, and attachments to other work.
- D. Samples for Initial Selection:
 - 1. Submit minimum 2-inch by 2-inch samples. Indicate full color and pattern.
- E. Samples for Verification:
 - 1. Submit minimum 4-inch by 4-inch sample for each color
 - 2. Delete below if mockups are not required
- F. Mockups:
 - 1. Build mockup to verify selections made under sample Submittals and to demonstrate aesthetic effects.
 - 2. Retain subparagraph below if mockups are erected as part of building rather than separately
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- G. Maintenance Data: Submit manufacturer's care and maintenance data, including care, repair and cleaning instructions. Include in Project closeout documents.

1.3 QUALITY ASSURANCE

- A. Manufacturers Qualifications:
 - 1. Materials and systems shall be manufactured by a company continuously and regularly employed in the manufacture of similar materials for a period of at least two consecutive years and which can show evidence of those materials being satisfactorily used on at least three projects of similar size, scope and location. At least three of the projects shall have been successful for use two years or longer.
 - 2. Manufactured panels must be produced from a minimum of 40 percent post-industrial recycle content.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver acoustic finishes and specified items in manufacturer's standard protective packaging.
- B. Do not deliver acoustic finishes, components and accessories to project site until areas are ready for installation.
- C. Store materials in a flat orientation in a dry place that is not exposed to exterior elements.
- D. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent damage or staining following installation for duration of project.
- E. Before installing acoustic finishes, permit them to reach room temperature.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustic clouds until spaces are enclosed and weatherproof, and ambient temperatures and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Feature Acoustical Clouds:
 - 1. 3form, LLC (Basis-of-Design)
 - 2. Arktura.
- B. Panel Acoustical Clouds:
 - 1. Armstrong Ceilings (Basis-of-Design); Product SOUNDSCAPES Shapes, Item 5440.
 - 2. Equivalent product of other manufacturer listed Section 09 51 00.

2.2 FEATURE ACOUSTICAL CLOUDS

- A. Product: Velo produced from Thermoformed Felt.
 - 1. Thermoformed Merino Felt with acoustic backer.
 - 2. Feature Thickness: up to 2.77"
- B. Sheet minimum performance attributes for Thermoformed Felt:
 - 1. Steiner Tunnel (ASTM E84). Material must attain a Flame Spread: 15, Smoke Developed: 165
 - 2. Noise Reduction Coefficient (ASTM C423) - 0.85
 - 3. Dynamic environmental testing (ASTM standards D 5116 and D 6670). Panels must not have detectable VOC off-gassing agents and must be have Greenguard™ Indoor Air Quality certified.
 - 4. Panels must be produced from a minimum of 40 percent post-industrial recycle content.

2.3 PANEL ACOUSTICAL CEILINGS

- A. Product (Basis-of-Design): Product SOUNDSCAPES Shapes, Item 5440.
- B. Panel Characteristics:
 - 1. Surface Texture: Fine
 - 2. Composition: Fiberglass
 - 3. Color: White
 - 4. Size: 48 in x 48 in
 - 5. Edge Profile: Square
 - 6. Flame Spread: ASTM E 1264; Class A (UL)
 - 7. Light Reflectance (LR) White Panel: ASTM E 1477; 0.90
 - 8. Dimensional Stability: HumiGuard Plus

9. Recycle Content: Post-Consumer minimum 10 percent; pre-consumer minimum 50 percent.

C. Suspension System: Manufacturer's system of attachment points along metal extrusion on back of each panel; clip assemblies, finish structure anchors, aircraft cable, caps, and cable adjusters.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide products of material, size, and shape required for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaner: Type recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where installation of Acoustic Tiles will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for installation and comply with requirements specified.

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions for the installation.

B. Utilize fasteners provided by manufacturer.

C. Install components in accordance with approved shop drawings and product data.

3.3 CLEANING AND PROTECTION

A. Protect surfaces from damage until date of substantial completion.

B. Repair work or replace damaged work, which cannot be repaired to Architect's satisfaction.

END OF SECTION

SECTION 09 54 50 - FRP CEILING SYSTEM**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Glass-fiber panel ceiling system; GFC on Drawings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants.

1.3 REFERENCE STANDARDS

- A. ASTM A 641/A 641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- B. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- C. ASTM C 636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. LEED Submittals: Provide documentation of Noise Reduction Coefficient (NRC) for all classroom ceilings and comply with Section 01 81 13.
 - 1. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied acoustical sealants: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
- C. Product Data: Provide data on each type of product indicated.
- D. Coordinate Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling suspension members.
 - 2. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 4. Minimum Drawing Scale: 1/8 inch = 1 foot.
- E. Samples for Initial Selection: For each type of glass-fiber ceiling panel and suspension system indicated.
- F. Product Certificate: Signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- G. Maintenance Data: For finishes to include in maintenance manuals.
- H. Warranty: Special warranty specified in this Section

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide glass-fiber panel ceilings that comply with the following requirements:
 - 1. Surface-Burning Characteristics: Provide glass-fiber panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
 - a. Smoke-Developed Index: 450 or less.
- C. Regulatory Requirements: Exposed surfaces meet or exceed USDA and FSIS requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver glass-fiber panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing glass-fiber panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle glass-fiber panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install glass-fiber panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 COORDINATION

- A. Coordinate layout and installation of glass-fiber panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 PRODUCTS

2.1 GLASS-FIBER PANELS, GENERAL

- A. Glass-fiber Ceiling System Colors: As selected by Architect from manufacturer's standard range of colors.

2.2 GLASS-FIBER CEILING PANELS

- A. Products:
 - 1. Crane Composites; Glasbord with Surfseal.
- B. Lay-In Ceiling Panels:
 - 1. Size: 24 by 48 inches.
 - 2. Pattern: Embossed.
 - 3. Nominal Thickness: 0.12 inch.

2.3 GLASS-FIBER SUSPENSION SYSTEMS, GENERAL

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.
- B. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.

2.4 GLASS-FIBER SUSPENSION SYSTEM FOR GLASS-FIBER PANEL CEILING

- A. Products:
 1. Crane Composites; Sanigrid II Fiberglass Ceiling Grid System.
- B. Suspension System: Main and cross runners formed from glass-fiber that is moisture resistant (does not support mold or mildew and will not rust or corrode).
 1. Wall Angles: 12-foot long length fastened directly to wall with nylon drive rivets.
 2. Hold-Down Clips: Provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.
 3. Face Design: Flat, flush.
 4. Accessories: Provide connector clips, wall anchors, and other accessories as required for complete installation.

2.5 SEALANT

- A. Sealant: Refer to Section 07 90 00 and Section 01 81 13.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which glass-fiber panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of glass-fiber panel ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of glass-fiber panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans. Protection of In-Place Conditions:

3.3 INSTALLATION

- A. General: Install glass-fiber panel ceilings to comply with ASTM C 636, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- 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 supporting structure or of 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 location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. 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 three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of glass-fiber ceiling area and where necessary to conceal edges of glass-fiber panels.
1. Apply glass-fiber sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install glass-fiber panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned glass-fiber panels as follows:
 - a. Install panels with pattern running in one direction parallel to long axis of space.
 2. Install panels with edges fully hidden from view by flanges of suspension system runners and moldings.

3.4 CLEANING

- A. Clean exposed surfaces of glass-fiber panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 64 66 - WOOD ATHLETIC FLOORING**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes site finished wood strip flooring; subflooring; sheet vapor retarder and cushion pads; surface finishing and game markings; and ventilating base.
- B. Provide complete wood flooring systems for the gymnasium.

1.2 REFERENCES

- A. Maple Flooring Manufacturers Association (MFMA) - MFMA Guide Specifications.
- B. Southern Pine Inspection Bureau (SPIB).
- C. Underwriters Laboratories Inc.:
 - 1. UL - Fire Resistance Directory.
- D. Western Wood Products Association (WWPA).

1.3 PERFORMANCE REQUIREMENTS

- A. DIN-certified - meets or exceeds all six DIN 18032-2 criteria for ball bounce, shock absorption, deflection, area of deflection, rolling load and surface friction.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate floor termination details.
 - 2. Indicate provisions for expansion and contraction, base and game insert or socket devices.
 - 3. Indicate location, size, design, and color of game markings.
- B. Product Data: Submit data for flooring and accessories, and floor finish materials.
 - 1. Include documentation of compliance with specified DIN performance requirements.
- C. Samples: Submit two samples illustrating floor finish, color, and sheen.
- D. Installer must submit references documenting approval of flooring manufacturer and showing a minimum five years of continuous applicable experience under the current company name.
- E. Submit maintenance procedures, recommended maintenance materials, suggested schedule for cleaning, stripping, and re-finishing, stain removal methods, and polishes and waxes; include three copies of AMFMA Care and Preservation of Your Wood Floors.
- F. Submit field reports within 3 days of each visit by manufacturer's field service, as written by service representative.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with MFMA - Maple Flooring Manufacturers Association.
- B. Execute "MFMA Recommendations for Correct Preparation, Finishing and Testing of Concrete Subfloor Surfaces to Receive Wood Flooring."
- C. Products: Stamp MFMA mill number and grade on underside of each piece of wood flooring at factory.
- D. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years' experience.

2. Installer: Company specializing in performing Work of this Section with minimum five years' experience and approved by the flooring manufacturer.
- E. Pre-installation Conference:
1. Convene minimum one week prior to commencing Work of this Section.
 2. Review installation procedures including procedures for acclimation of flooring materials.

1.6 COORDINATION

- A. Contractor to coordinate actual slab depression necessary for selected floor system, prior to pouring of slab-on-grade concrete work.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install wood flooring until overhead mechanical work and lighting are installed.
- B. Do not install wood flooring until wet construction work is complete and ambient air at installation space has moisture content stabilized between 35 and 50 percent and temperature is stabilized between 65 and 80 degrees F.
- C. Do not install floor system until concrete has been cured 60 days.
- D. Do not install wood flooring until wood materials have been acclimated to ambient temperature and humidity conditions for minimum of 72 hours; stack wood for acclimation procedures to facilitate cross-ventilation of wood materials.
- E. Provide heat, light, and ventilation prior to installation.
- F. Maintain room temperature and humidity for period of two days prior to delivery of materials to installation space, during installation, and continuously after installation.

1.8 WARRANTY

- A. Field Finish Flooring Systems: Warrant the Work of this Section for two years against defective or nonconforming materials and workmanship.

PART 2 PRODUCTS

2.1 SYSTEM

- A. Manufacturer/System: Subject to compliance with requirements, provide wood gymnasium floor system by one of the following:
1. Action Floor Systems, LLC; Actionthrust I.
 2. Connor Sport Court International, Inc.; Neoshok.
 3. Robbins Sports Surfaces; Bio-Cushion Classic.
 4. Aacer Sports Flooring; AacerFlex EN/DIN.

2.2 COMPONENTS

- A. Wood Strip Flooring: White Hard Maple.
1. Grade: Second and better.
 2. Cut: Mixed grain (flat grain and edge grain).
 3. Moisture Content: 7 to 9 percent.
 4. Actual Thickness: 25/32 inch.
 5. Actual Width: 2-1/4 inches.
 6. Edge: Tongue and Groove.
 7. End: End matched.
 8. Length: As permissible by Grade.
- B. Flooring Nails: Type recommended by flooring manufacturer.

- C. Construction Adhesive: Type recommended by flooring manufacturer for installation of subflooring.
- D. Subflooring:
 - 1. Gymnasium: Two layers of 15/32 inch thick plywood. No added urea formaldehyde resins.
- E. Resilient Pads: Required to meet performance requirements.
 - 1. Flooring system shall have been independently tested to the International Standards: DIN 18032, Part 2, EN 14904 or MFMA PUR.
 - 2. FIBA International Standards
 - 3. Independent DIN testing laboratory must be recognized by the MFMA and test to all the required standards of the DIN testing methodologies.
 - 4. Independent DIN testing laboratory shall have Scientific Body Membership in the International Association of Sports Surface Sciences (ISSS).

2.3 ACCESSORIES

- A. Vapor Retarder: Black polyethylene sheet, 6 mil thick; 2 inch wide tape for joint sealing.
- B. Back Prime Paint: Acrylic enamel undercoater product specified in Division 9 Section "Interior Painting;" subfloor only.
- C. Ventilating Base:
 - 1. Molded rubber, 4 inches high with 3-inch toe, ventilating type, with adhesives and accessories.
 - a. FloorScore certified.
 - 2. Color as selected by Architect from manufacturers full range.
 - 3. Pre-molded outside corners; neatly mitered inside corners.
 - 4. Basis-of-Design: Vent-Cove by Johnsonite.
- D. Gameline, Side Court Graphics, and Logo Paint: Recommended by the finishing materials manufacturer; compatible with finish.
- E. Adhesives, primers, paints and coatings applied within the building waterproofing envelope; Comply with low-emitting requirements.

2.4 FINISHES

- A. Floor-Finish System: System of compatible components recommended in writing by flooring manufacturer, and MFMA approved.
 - 1. Floor-Sealer Formulation: Pliable, penetrating type. MFMA Group 1, Sealers.
 - 2. Finish-Coat Formulation: Formulated for gloss finish indicated and multicoat application.
 - a. Type: MFMA Group 5, Water-Based Finishes.
 - 3. Game-Line and Marker Paint: Industrial enamel compatible with finish coats and recommended in writing by manufacturers of finish coats, and paint for this use.
 - 4. VOC Content: Finish system materials, game-line, and marker paint shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of wood athletic flooring.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Concrete Slabs: Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m) , and perform no fewer than two tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Perform anhydrous calcium chloride test per ASTM F 1869, as follows:
 - 1) First option in first subparagraph below is based on National Wood Flooring Association recommendations and on floor-covering industry practices for adhered floor coverings to avoid adhesive failures; second option is based on MFMA recommendations. Retain the lower value if assembly components are adhered to slab; consult manufacturers for recommendations.
 - 2) Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - 3) Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 1) If substrate does not pass testing specified above, provide and install topical or penetrant moisture control system to slab area not passing. Include concrete substrate preparation recommended by control system manufacturer. Repeat testing specified above, and proceed with installation only after substrates pass testing.

3.2 PREPARATION

- A. Grind high spots and fill low spots on concrete substrates to produce a maximum 1/8-inch (3-mm) deviation in any direction when checked with a 10-foot (3-m) straight edge.
 - 1. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
- B. Remove coatings including curing compounds and other substances on substrates that are incompatible with installation adhesives and that contain soap, wax, oil, or silicone; use mechanical methods recommended by manufacturer. Do not use solvents.
- C. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. General: Comply with wood athletic flooring manufacturer's written instructions, but not less than written recommendations of MFMA applicable to flooring type indicated.
- B. Pattern: Lay flooring parallel with long dimension of space to be floored unless otherwise indicated.
- C. Expansion Spaces: Provide as indicated, but not less than that required by manufacturer's written instructions and MFMA's written recommendations at walls and other obstructions, and at interruptions and terminations of flooring.
 - 1. Indicate on Drawings how expansion spaces are covered, or insert requirements in subparagraph below.
 - 2. Cover expansion spaces with base molding, trim, and saddles, as indicated on Drawings.

- D. Vapor Retarder: Cover entire slab area beneath wood flooring. Install with joints lapped a minimum of 6 inches (150 mm) and sealed.
- E. Floating Resilient Subflooring:
 - 1. Place vapor retarder over subfloor surface, lapping edges and ends minimum 6 inches and tape seal.
 - 2. Place pre-assembled first layer subfloor panels perpendicular to finished flooring, spacing end joints a minimum of 1/4 inch.
 - 3. Align each adjacent row of subfloor panels to form generally continuous 45-degree end joints throughout the subfloor assembly.
 - 4. Install second layer of plywood material laid diagonally at opposite 45 degree angles over the first layer with 1/4" spacing on all edges, breaking rows at 4'. Second layer shall be attached according to manufacturer's recommendations.
 - 5. Provide 1-1/2 inches expansion voids at perimeter and at all vertical obstructions. Install solid blocking under bleachers in the stacked position, at doorways, and below portable goals.
- F. Prepare substrate to receive wood flooring in accordance with manufacturer's and MFMA instructions.
- G. Broom clean substrate.
- H. Wood Flooring:
 - 1. Install in accordance with manufacturer's instructions; blind nail to wood sub-floor.
 - 2. Lay flooring parallel to length of room areas; verify alignment as Work progresses.
 - 3. Arrange flooring with end matched grain properly driven up and proper spacing provided for humidity conditions in region; consult manufacturer's representative.
 - 4. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
 - 5. Provide minimum 1-1/2 inch expansion space at fixed walls and other vertical interruptions; 1 inch expansion space at floor inserts.
- I. Ventilating Base: Install base at floor perimeter to cover expansion space; anchor to wall with manufacturer's screws and anchors.
- J. Installation Tolerances: 1/8 inch in 10 feet (3 mm in 3 m) of variance from level.

3.4 SANDING AND FINISHING

- A. Allow installed flooring to acclimate to ambient conditions before sanding.
- B. Follow applicable recommendations in MFMA's "Industry Recommendations for Sanding, Sealing, Court Lining, Finishing, and Resurfacing of Maple Gym Floors."
- C. Machine sand with coarse, medium, and fine grades of sandpaper to achieve a level, smooth, uniform surface without ridges or cups. Remove sanding dust by tack or vacuum.
- D. Finish: Apply seal and finish coats of finish system according to finish manufacturer's written instructions.
 - 1. Water-Based Finishes: Use finishing methods recommended by finish manufacturer to reduce grain raise and sidebonding effect.
 - 2. Game-Line and Marker Paint: Apply game-line and marker paint between final seal coat and first finish coat according to paint manufacturer's written instructions.
 - a. Mask flooring at game lines and markers, and apply paint to produce lines and markers with sharp edges.

- b. Where game lines cross, break minor game line at intersection; do not overlap lines.
- c. Apply game lines and markers in widths and colors according to requirements indicated on Drawings.
- d. Apply finish coats after game-line and marker paint is fully cured.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.6 PROTECTION

- A. Protect wood athletic flooring during remainder of construction period to allow finish to cure and to ensure that flooring and finish are without damage or deterioration at time of Substantial Completion.
 - 1. Do not cover flooring after finishing until finish reaches full cure and not before seven days after applying last finish coat.
 - 2. Do not move heavy and sharp objects directly over flooring. Protect fully cured floor finishes and surfaces with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION

SECTION 09 65 00 - RESILIENT FLOORING**PART 1 GENERAL****1.1 SECTION INCLUDES**

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

1.2 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Certification: Submit written certification by manufacturer declaring products do not contain asbestos.
- E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-sealing.
- F. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For resilient flooring and base, if available: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content resilient flooring and base: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - 3. MR Credit 4: BPDO - Material Ingredients
 - a. For resilient flooring, base, and adhesive, if available: Material Ingredient Report.
 - 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives, primers, and sealers: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
 - b. For resilient flooring and base: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 or Resilient Floor Covering Institute's (RFCI) FloorScore Certification.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.
- B. Testing Agency Qualifications: Independent firm specializing in performing concrete slab moisture testing and inspections of the type specified in this section.

1.5 DELIVERY, STORAGE, AND HANDLING

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

1.6 FIELD CONDITIONS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.7 EXTRA MATERIALS

- A. One percent of each color and type of flooring used, minimum of one box of each color and type.
- B. Materials to be from the same dye lot as those installed.

PART 2 PRODUCTS

2.1 SHEET FLOORING

- A. Resilient Sheet Flooring: Flexible PVC sheet flooring with a laminated construction including a wear layer, fiberglass reinforced print layer, and PVC backing.
 - 1. Location: Tread and Risers at Library Commons.
 - 2. Basis-of-Design: Polyflor Forest fx.
 - a. Design: Wood effect sheet vinyl flooring.
 - b. Size: 2 meter wide rolls, cut to fit treads and risers.
 - c. Thickness: 2 mm at riser, 2 mm plus foam backing at tread.
 - d. Nosing: As selected from Johnsonites' full line of Flexible Vinyl or Solid Color Flexible Vinyl Stair Nosings.

2.2 ACCESSORIES

- A. Subfloor Filler: Latex-modified, portland cement based or blended hydraulic cement based formulation; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
 - 1. Comply with low-emitting requirements specified in Section 01 81 13.
- C. Sealer: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive resilient flooring.

- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
 - 1. Test in accordance with ASTM F710.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.
- E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.
- E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- G. Scribe flooring to walls, columns, floor outlets, and other appurtenances to produce tight joints; extend flooring under cabinets to wall.

3.4 CLEANING

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

3.5 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.
- B. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
- C. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient molding accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED Submittals:
 - 1. Product Data for adhesives, documentation including printed statement of VOC content.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.
- E. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

A. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:
 - a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - b. Estrie Products International; American Biltrite (Canada) Ltd.
 - c. Johnsonite.
 - d. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
 - e. Roppe Corporation, USA.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous).
3. Style: Straight.

C. Minimum Thickness: 0.125 inch (3.2 mm).

D. Height: As indicated on Drawings.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Manufacturer's pre-molded accessory.

G. Inside Corners: Job formed.

H. Finish: As selected by Architect from manufacturer's full range.

I. Colors and Patterns: Refer to Finish Legend.

2.2 RESILIENT MOLDING ACCESSORY

A. Material: Vinyl or Rubber.

B. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products until Substantial Completion.

END OF SECTION

SECTION 09 65 23 - RESILIENT PERFORMANCE FLOORING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Vinyl sheet flooring with rubber back, adhesively installed.
- B. Vinyl sheet flooring finish over sprung floor assembly.
- C. Sprung floor assembly.
- D. Accessories.

1.2 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, and layout, colors.
- D. Selection Samples: Manufacturer's color charts for flooring materials specified, indicating full range of colors and textures available.
- E. Verification Samples: Actual flooring material specified, not less than 12 inch square, mounted on solid backing.
- F. Sustainable Design Submittal: Submit VOC content documentation for flooring and adhesives.
- G. Concrete Sub-floor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer certified in writing by the flooring manufacturer to be qualified for installation of specified flooring system.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
- B. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

PART 2 PRODUCTS**2.1 PREFORMED PERFORMANCE FLOORING**

- A. Recycled Rubber Back Vinyl Flooring:
 - 1. Basis-of-Design: Ecore Vinyl Rx; fusion bonded, double-ply, rubber back vinyl surface.
 - 2. Location: Dance Studio.
 - 3. Description: Made from a formulation of high quality post-consumer recycled rubber granules encapsulated in a wear and water-resistant elastomeric network fusion bonded to a heterogeneous, PUR enhanced, vinyl wear layer.

4. Sheet Dimension:
 - a. Overall Thickness: 7mm
 - b. Rubber Backing: 5mm.
 - c. Vinyl Surface Layer: 2mm.
 - d. Roll Size: 6-feet wide X 30 linear feet.
 5. Performance:
 - a. Dynamic Rolling Load (ASTM F970): 10,000 cycles: No Damage, No Change.
 - b. Static Load Limit (ASTM F970): Pass
 - c. CHPS/CA 01350 (ASTM D5116): Pass.
- B. Vinyl Sheet Flooring Finish over Sprung Floor Assembly:
1. Basis-of-Design:
 2. Location: Stage.
 3. Sheet Dimension:
 - a. Overall Thickness: 2mm
 - b. Roll Size: 6'-6-3/4" wide X 65 linear feet.
- C. Sprung Floor Assembly:
1. Basis-of-Design: EFS Entertainment Flooring Systems; Product EFS Sprung Floor.
 - a. Other Manufacturers: Dance Equipment International; Product #800 Multi-Flex Dance Floor.
 2. Location: Stage.
 3. Description:
 - a. D.I.N. Certified.
 - b. Constructed from eleven-layer beech and alder plywood, with resilient channel understructure; double tongue and groove edge joint.
 - c. Assembled panel size of 5-3/8-inch wide X 7'-11-3/4" planks.
 - d. Overall Assembly Height: 1-1/4 inches.
 4. Performance:
 - a. Shock Absorption: 62 percent.
 - b. Rolling Load: 1,500 N minimum.
 5. Moisture Barrier: Black polyethylene sheet, 6 mil thick; 2 inch wide tape for joint sealing.

2.2 ACCESSORIES

- A. Leveling Compound: Latex-modified cement formulation as recommended by flooring manufacturer for substrate conditions.
- B. Flooring and Sprung Floor Assembly Adhesive: Waterproof; types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of performance flooring. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of performance flooring to substrate.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.

1. Test in accordance with ASTM F710.
2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.2 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Concrete: Use leveling compound as necessary to achieve substrate flatness of plus or minus 1/8 inch within 10 ft radius.
- C. Remove coatings that are incompatible with flooring adhesives, using methods recommended by flooring manufacturer.
- D. Broom clean areas to receive athletic flooring immediately before beginning installation.
- E. Moisture Barrier - Sprung Floor: Cover entire slab area beneath wood flooring. Install with joints lapped a minimum of 6 inches (150 mm) and sealed.

3.3 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Resilient Sheet Flooring:
 1. Unroll flooring and allow to relax before beginning installation.
 2. Mix adhesive thoroughly and apply to substrate with notched trowel. Roll flooring into fresh adhesive, butting factory edges and compression fitting.
 3. Roll entire flooring surface with steel roller to assure adhesion to substrate and eliminate air bubbles.
 4. Immediately remove any adhesive from flooring surface, using chemical recommended by flooring manufacturer.
 5. Weld seams using techniques and equipment recommended by manufacturer.
- D. Sprung Floor Assembly: Hold in place with manufacturers adhesive; produce undetectable seams.

3.4 CLEANING

- A. Clean flooring using methods recommended by manufacturer.

3.5 PROTECTION

- A. Protect finished flooring from construction traffic to ensure that it is without damage upon Date of Substantial Completion.

END OF SECTION

SECTION 09 65 66 - RESILIENT RUBBER TILE ATHLETIC FLOORING**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Rubber tile floor covering.
- B. Related Sections include the following:
 - 1. Division 9 Section "Resilient Wall Base and Accessories" for wall base and accessories installed with floor coverings.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation details and locations of Seam locations.
- C. Samples for Initial Selection: For floor covering indicated.
- D. Samples for Verification: For each color of floor covering indicated, 6-inch square Samples of same thickness and material indicated for the Work.
- E. Maintenance Data: For floor coverings to include in maintenance manuals.
- F. Product data for adhesives and sealants applied within the building water proofing envelope, documentation including printed statement of VOC content in g/L.
- G. Product data for resilient flooring, base, and associated accessories, documentation including printed statement of compliance with the Resilient Floor Covering Institute's (RFCI) FloorScore Program.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storing.
- B. Store materials to prevent deterioration. Store rolls upright.

1.4 PROJECT CONDITIONS

- A. Adhesively Applied Products:
 - 1. Maintain temperatures within range recommended in writing by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor coverings during the following time periods:
 - a. 48 hours before installation, unless longer period is recommended in writing by manufacturer.
 - b. During installation.
 - c. 48 hours after installation, unless longer period is recommended in writing by manufacturer.
 - 2. After postinstallation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 55 deg F or more than 95 deg F.
 - 3. Close spaces to traffic during floor covering installation.
 - 4. Close spaces to traffic for 48 hours after floor covering installation, unless manufacturer recommends longer period in writing.
- B. Install floor coverings after other finishing operations, including painting, have been completed.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Sheet Flooring: 5% of the floor surface to receive this type.

PART 2 PRODUCTS

2.1 RUBBER FLOOR COVERING

- A. Basis-of-Design: Mondo; Ramflex tiles; 3/8 inch thickness.
 - 1. Other Available Products:
 - a. SportFloor - ProXL by Northwest Rubber.
- B. Physical Properties of the floor covering to conform or exceed the following:

1. Physical Properties	Standard	Specification
2. Hardness Shore A	ASTM D 2240	78/72 tile, 64/40 sheet
3. Critical Radiant Flux	ASTM E 648, NFPA 101 Class I	
4. Static Load Limit	ASTM F 970	0.004 in.
5. Fungal Resistance Test	ASTM G 21-90	No growth
6. Coefficient of Friction	ASTM D 2047	> 0.9 tile
7. V.O.C. Compliance	ASTM D 5116	Yes
- C. Material:
 - 1. Rubber wear layer and rubber shock-absorbent layer, vulcanized together.
- D. Installation Method: Adhered.
- E. Traffic Surface Texture: Smooth.
- F. Tile Size: 36 x 36 inches.
- G. Color and Pattern: As selected by Architect from manufacturer's full range.
- H. Accessories:
 - 1. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by floor covering manufacturer.
 - 2. Installation Adhesive: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.
 - a. Adhesives applied within the building waterproofing envelope: Comply with VOC limits.
- I. Comply with RFCI FloorScore Program.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of floor coverings.

- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Alkalinity and Adhesion Testing: Perform tests recommended in writing by manufacturer. Proceed with installation only after substrates pass testing.
 - a. PH level must be in range of 7 to 8.5 and accepted by manufacturer.
 - 3. Moisture Testing:
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - 1) Perform tests so that each test area does not exceed 200 sq. ft. and perform not less than 2 tests in each installation area and with test areas evenly spaced in installation areas.
 - b. Perform tests recommended in writing by manufacturer. Proceed with installation only after substrates pass testing.
- C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by manufacturer. Do not use solvents.
- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- E. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation, unless manufacturer recommends a longer period in writing.
 - 1. Do not install floor coverings until they are same temperature as space where they are to be installed.
- F. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 FLOOR COVERING INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions.
- B. Scribe, cut, and fit floor coverings to butt neatly and tightly to vertical surfaces, equipment anchors, floor outlets, and other interruptions of floor surface.
- C. Extend floor coverings into toe spaces, door reveals, closets, and similar openings, unless otherwise indicated.
- D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating subfloor markings on floor coverings. Use nonpermanent, nonstaining marking device.
- E. Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and floor covering manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
 - 1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after completing floor covering installation:
 - 1. Remove adhesive and other blemishes from floor covering surfaces.
 - 2. Sweep and vacuum floor coverings thoroughly.
 - 3. Damp-mop floor coverings to remove marks and soil.

- a. Do not wash floor coverings until after time period recommended in writing by manufacturer.
- B. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
 1. Do not move heavy and sharp objects directly over floor coverings. Protect floor coverings with plywood or hardboard panels to prevent damage from storing or moving objects over floor coverings.

END OF SECTION

SECTION 09 68 13 - TILE CARPETING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Carpet tile, fully adhered.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate layout of joints.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- E. Submit two, 12 inch long samples of edge strip.
- F. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For carpet: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content carpet: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - b. For bio-based carpet (wool): Manufacturer letter on company letterhead stating raw material supplier's compliance with Sustainable Agriculture Network's (SAN) Sustainable Agriculture Standard, including a link to a publicly available document confirming SAN compliance, dated within one year of the LEED project registration. Include statement indicating percentage by weight of the total assembly that is bio-based. Include material cost.
 - c. For manufacturers with extended producer responsibility programs: Documentation describing the program and confirmation that product is included in the program.
 - 3. MR Credit 4: BPDO - Material Ingredients
 - a. For carpet and adhesive: Material Ingredient Report.
 - 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
 - b. For carpet: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 or Carpet and Rug Institute's (CRI) Green Label Plus (GLP).
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed, with a minimum of 1 full box of each type, color, and pattern.

1.3 INSTALLER QUALIFICATIONS

- A. Company specializing in performing Work of this Section with minimum five years experience.

- B. Installers trained, accepted and certified by the carpet manufacturer, or FCIB, IFCI or CRI certified carpet installers.

1.4 FIELD CONDITIONS

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.
- B. Coordinate with requirements of Section 01 57 21.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Tandus: www.tandus.com.
- B. Interface, Inc: www.interfaceinc.com. (Basis-of-Design)
 - 1. Primary Product: Human Connections Collection.
 - 2. Secondary/Complimentary Products: Rue and Stone Course.
- C. Milliken & Company: www.milliken.com.

2.2 MATERIALS

- A. General:
 - 1. Interior wet-applied adhesives: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
 - 2. Carpet: Comply with California Department of Public Health (CDPH) Standard Method v1.1-2010 or Carpet and Rug Institute's (CRI) Green Label Plus (GLP).
 - 3. Recycled Content: Provide carpet with recycled content.

2.3 ACCESSORIES

- A. Sub-Floor Filler: Cementitious type; type recommended by flooring material manufacturer.
- B. Edge Strips: Rubber, color as selected by Architect.
- C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer to LEED qualifications; releasable type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.
- D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- B. Vacuum clean substrate.

3.3 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.

- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Install carpet tile in accordance with manufacturer's instructions and CRI 104.
- D. Blend carpet from different cartons to ensure minimal variation in color match.
- E. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- F. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- G. Locate change of color or pattern between rooms under door centerline.
- H. Fully adhere carpet tile to substrate.
- I. Trim carpet tile neatly at walls and around interruptions.
- J. Complete installation of edge strips, concealing exposed edges.

3.4 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 84 33 00
ACOUSTIC ROOM COMPONENTS**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Sound-absorbing wall panels, custom-fabricated and fabric-finished.
- B. Sound-diffusing wall panels.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - 2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. ASTM E795 Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Surface Burning Characteristics (ASTM E84):
 - a. Flamespread: 25 maximum.
 - b. Smoke Developed: 450 maximum.
 - c. Fire ratings for all fabric covered panels is based on testing of the panel wrapped with the standard in stock fabric, Guilford of Maine, FR 701 Style 2100.
 - d. Wall mounted sound diffusers shall be Class A rated, minimum

1.4 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit product data sheet, for specified products.
- C. Shop Drawings: Submit shop drawings showing layout, edge profiles and panel components, including anchorage, accessories, finish colors and textures.
- D. Samples: Submit selection and verification samples of finishes, colors and textures.
- E. Test Reports: Certified test reports showing compliance with specified performance requirements.
 - 1. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirements Section.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements: Do not install panels until wet work, such as concrete and plastering, is complete; the building is enclosed; and the temperature and relative humidity are stabilized at 60 - 80 degrees F (16 - 27 degrees C) and 35% MINIMUM RH and 55% MAXIMUM RH, respectively. All

products constructed with wood or wood fiber content must be stored for at least 72 hours in the controlled environment specified herein prior to installation to allow the materials to stabilize.

PART 2 - PRODUCTS

2.1 WALL PANELS

A. Manufacturers:

1. Wenger Corporation / JR Clancy: 555 Park Dr.; Owatonna, MN 55060; 800-493-6437; Tel: 507-455-4100; Fax: 507-455-4258; request info (lori.maas@wengercorp.com); www.wengercorp.com|www.JRClancy.com
2. Kinetics Noise Control: PO Box 655, 6300 Ireland Place, Dublin, OH 43017; (614)889-0480; Fax: 614-889-0075; intsales@kineticsnoise.com; www.kineticsnoise.com
3. Decoustics Limited: 61 Royal Group Crescent; Woodbridge, Ontario, Canada, L4H1X9; 905-652-5200; Fax: 905-652-2505; sales@decoustics.com; www.decoustics.com
4. RPG Diffuser Systems, Inc. 651-C Commerce Drive, Upper Marlboro, MD 20774; 301-249-0044; Fax: 301-249-3912, www.rpginc.com

2.2 MANUFACTURED UNITS

A. HardSide Panels:

1. Thickness: 3 inches (76 mm).
2. Size: As indicated on the drawings up to a maximum 48 inches (1219 mm) x 120 inches (3048 mm) panel.
3. Core 3 inches (76 mm) thick fiberglass, 6 - 7 pcf (96 - 112 kg/m³) density.
4. Edge Detail: [Square] [Round] [Mitered] [Beveled] [Pencil] hardened with non-resin, Class A hardening solution.
5. Facing: [100% polyester fabric, FR 701 Style 2100 by Guilford of Maine] [Factory approved customer selected fabric]. Designer-selected fabrics must be approved by the panel manufacturer as acceptable quality for wrapping and covering core materials. Some fabrics are unstable, too stiff, or lack the weight and thread density for producing an acceptable finish product.
 - a. Color: As selected from fabric manufacturer's full range of colors.
6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 48-inch (1219 by 1219 mm) unit:

a.	125	250	500	1000	2000	4000
b.	0.90	1.03	1.06	1.01	0.98	0.97
7. Mounting Accessories: [HS impaling clips] [Z-clips] [Velcro] [Rotofast Snap-On].

B. High Impact HardSide Panels:

1. Thickness 2 1/8 inches (54 mm).
2. Size: As indicated on the drawings up to a maximum 48 inches (1219 mm) x 120 inches (3048 mm) panel.
3. Core: 2 inches (51 mm thick fiberglass, 6 - 7 pcf (96 - 112 kg/m³) density, with bonded facing layer of 10 pcf (192 kg/m³), 1/8 inch (3.2 mm) thick impact resistant fiberglass.
4. Edge Detail: [Square] [Round] [Mitered] [Beveled] [Pencil] hardened with non-resin, Class A hardening solution.
5. Facing: [100% polyester fabric, FR 701 Style 2100 by Guilford of Maine] [Factory approved customer selected fabric]. Designer selected fabrics must be approved by the panel manufacturer as acceptable quality for wrapping and covering core materials. Some fabrics are unstable, too stiff, or lack the weight and thread density for producing an acceptable finish product.
 - a. Color: As selected from fabric manufacturer's full range of colors.

6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 48-inch (1219 by 1219 mm) unit:
 - a. 125 250 500 1000 2000 4000
 - b. 0.44 0.75 1.14 1.15 1.11 1.05
 7. Mounting Accessories: [HS impaling clips] [Z-clips] [Velcro] [Rotofast Snap-On].
- C. Geometric Diffuser Sound-Diffusing Panel
1. Constructed from 0.125 inch (3.2 mm) thermo-molded copolymer.
 2. Sizes and shapes as indicated on the drawings.
 - a. 4 feet (*actual*) x 6 feet (*actual*) x 9.75 inches (1220 x 1830 x 248 mm) radius.
 3. Edge Detail: Rounded pencil edge thermo-molded frame formed on a geometric radius or offset pyramidal shaped unit.
 4. Finish: [Standard white textured finish] [Fabric facing: Manufacturer's standard 100% polyester woven fabric, FR701 Style 2100 by Guilford of Maine].
 5. Color: As selected from manufacturer's full range of colors.
 6. Sound Absorption (ASTM C423): Noise Reduction Coefficient shall be no greater than 0.10 for Type A Mounting (direct mount).
 7. Mounting: Wall mount with top of panel angle and Z-clip. [Optional: Bottom angle if required to secure panel]
 8. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 48-inch (1219 by 1219 mm) unit:
 - a. 125 250 500 1000 2000 4000
 - b. 0.48 0.12 0.10 0.05 0.03 0.03
 9. Mounting Accessories: [HS impaling clips] [Z-clips] [Velcro] [Rotofast Snap-On].

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 EXAMINATION

- A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
 1. Verify that stud spacing is 16 inches (406 mm) o.c. maximum, for panels installed over open studs.
 2. Do not install panels until unsatisfactory conditions are corrected.

3.3 CLEANING

- A. Follow manufacturer's instructions for cleaning panels soiled during installation. Replace panels that cannot be cleaned to as new condition.
- B. Keep site free from accumulation of waste and debris.

END OF SECTION

SECTION 09 84 13 - ACOUSTICAL PANELS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Factory-painted fiberglass core panels and mounting accessories.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, panel layout, and fabric orientation.
- D. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available .
- E. Verification Samples: Fabricated samples of each type of panel specified; 12 by 12 inch, showing construction, edge details, and fabric covering.
- F. LEED Submittals: Comply with Section 018113.
 - 1. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied sealants, paints, primers, and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
 - b. For wallcovering and acoustic insulation: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 or GREENGUARD Gold certification.

1.3 QUALITY ASSURANCE

- A. Warranty Period for Cementitious Wood Fiberboard Wall Panels: Lifetime.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical panels from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until panels are needed for installation.
- B. Store panels flat, in dry, well-ventilated space; do not stand panels on end.
- C. Protect panel edges from damage.
- D. Store, handle, protect and install absorptive materials, including fabrics materials, in accordance with the Construction IAQ Management Plan required by Division 1 Specifications.

PART 2 PRODUCTS**2.1 GENERAL**

- A. Wallcovering and acoustic insulation: Comply with California Department of Public Health (CDPH) Standard Method v1.1-2010 or GREENGUARD Gold certification.
- B. Interior wet-applied adhesives, sealants, paints, primers, and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."

2.2 PAINTED ACOUSTICAL WALL PANELS

- A. Basis-of-Design: Conwed Designscape New Dimensions Acoustical Wall Panels.
- B. Core Fiberglass Density: 6 - 7 pcf.

- C. Core laminated with 1/8 inch, 16 - 20 pcf molded glass fiber.
- D. Assembly Accessories: Provide optional kerfs/splines for abutting square-edge panels.
- E. Recycled Content: For fiberglass, minimum 50 percent pre-consumer and 5 percent post-consumer recycled content.
- F. Edge Treatment: Resin hardened; spline and kerf for abutting edges.
- G. Finish: Factory painted drywall-look; color to be custom to match Architect's selection.

2.3 FABRICATION

- A. Resin harden perimeter edges and areas of core for attachment of mounting brackets.
- B. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch for thickness, overall length and width, and squareness from corner to corner.

2.4 ACCESSORIES

- A. Spline-Mounting Accessories: Manufacturer's standard concealed connecting splines of manufacturer's standard designed for screw attachment to walls, with coordinating moldings and trim for interior and exterior corners and miscellaneous conditions.
 - 1. Color of Exposed Trim: As selected from manufacturer's standards.
- B. Back-Mounting Accessories: Manufacturer's standard accessories for concealed support, designed to allow panel removal, and as follows:
 - 1. Two-part clip and base-support bracket system; brackets designed to support full weight of panels and clips designed for lateral support, with one part mechanically attached to back of panel and the other attached to substrate.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install acoustical panels in locations indicated, following installation recommendations of panel manufacturer. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.
- B. Install panels to construction tolerances of plus or minus 1/16 inch for the following:
 - 1. Plumb and level.
 - 2. Flatness.

3.2 CLEANING

- A. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.
- B. Remove surplus materials, trimmed portions of panels, and debris resulting from installation.

3.3 PROTECTION

- A. Provide protection of installed acoustical panels until completion of the work.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

SECTION 09 84 36.13
SOUND-DIFFUSING CEILING PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Sound-diffusing ceiling panels.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - 2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. ASTM E795 Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Surface Burning Characteristics (ASTM E84): Wall & Ceiling mounted Model Geometric Sound Diffusers shall be Class A rated, minimum.

1.4 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit product data sheet, for specified products.
- C. Shop Drawings: Submit shop drawings showing layout, edge profiles and panel components, including anchorage, accessories, finish colors and textures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirements Section.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions. Environmental conditions required for storage are the same as for installation, see 1.06 Project Conditions.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements: Do not install diffusers or reflectors until wet work, such as concrete and plastering, is complete; the building is enclosed; and the temperature and relative humidity are stabilized at 60 - 80 degrees F (16 - 27 degrees C) and 40% to 50%, respectively.

PART 2 - PRODUCTS

2.1 SOUND-DIFFUSING CEILING PANELS

- A. Manufacturers:
 - 1. Wenger Corporation / JR Clancy: 555 Park Dr.; Owatonna, MN 55060; 800-493-6437; Tel: 507-455-4100; Fax: 507-455-4258; request info (lori.maas@wengercorp.com); www.wengercorp.com|www.JRClancy.com

2. Kinetics Noise Control: PO Box 655, 6300 Ireland Place, Dublin, OH 43017; (614)889-0480; Fax: 614-889-0075; intsales@kineticsnoise.com; www.kineticsnoise.com
3. Decoustics Limited: 61 Royal Group Crescent; Woodbridge, Ontario, Canada, L4H1X9; 905-652-5200; Fax: 905-652-2505; sales@decoustics.com; www.decoustics.com
4. RPG Diffuser Systems, Inc. 651-C Commerce Drive, Upper Marlboro, MD 20774; 301-249-0044; Fax: 301-249-3912, www.rpginc.com

2.2 MANUFACTURED UNITS

A. Geometric Diffuser Sound-Diffusing Panel

1. Constructed from 0.125 inch (3.2 mm) thermo-molded copolymer.
2. Sizes and shapes as indicated on the drawings. Select from:
3. 2 feet x 4 feet x 5.25 inches (610 x 1220 x 133 mm) radius.
4. Edge Detail: Rounded pencil edge thermo-molded frame formed on a geometric radius.
5. Finish: Standard white textured finish.
6. Color: As selected from manufacturer's full range of colors.
7. Sound Absorption (ASTM C423): Noise Reduction Coefficient shall be no greater than 0.10 for E400 Mounting (lay-in ceiling).
8. Mounting: Lay-in 15/16 inch (24 mm) grid.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 EXAMINATION

- A. Site Verification of Conditions: Verify that substrate or supporting structure, which has been previously installed under other sections, is acceptable for product installation in accordance with manufacturer's instructions.

3.3 CLEANING

- A. Follow manufacturer's instructions for cleaning panels soiled during installation. Replace panels that cannot be cleaned to as new condition.
- B. Keep site free from accumulation of waste and debris.

END OF SECTION

SECTION 09 91 23 - INTERIOR PAINTING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete.
 - 2. Concrete masonry units (CMU).
 - 3. Steel.
 - 4. Galvanized metal.
 - 5. Wood.
 - 6. Gypsum board.
 - 7. Wood fiber acoustical panels.
 - 8. Cotton or canvas insulation coverings.
 - 9. Exposed PVC piping.
- B. Project includes painted murals or graphics within event spaces; following application of specified interior paint system, apply graphics with specified top coat and the use of precision cut masking films manufactured especially for paint masking - similar to court graphics.
- C. Stain and graffiti coatings for exposed interior concrete formed walls to be as specified within Section 03 33 00.

1.2 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Submittal procedures, project meetings, progress schedules and documentation, reports, coordination.

1.3 DEFINITIONS

- A. Gloss Ranges:
 - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
 - 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 - 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 - 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 REFERENCE STANDARDS

- A. ASTM D 3359 - Standard Test Methods for Measuring Adhesion by Tape.
- B. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for each type of product submitted.
- C. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations

- a. For paints and coatings, if applicable: Product-specific declaration or Industry-wide EPD or product-specific EPD.
2. MR Credit 4: BPDO - Material Ingredients
 - a. For paints and coatings, if available: Material Ingredient Report.
3. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied paints and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
- D. LEED Submittal: Provide documentation of VOC content in g/L for primers, paints and coatings applied within the building waterproofing envelope.
- E. Samples for Initial Selection: Submit each type of topcoat product indicated.
- F. Samples for Verification: Submit each type of paint system and each color and gloss of topcoat indicated.
 1. Submit Samples on rigid backing, minimum 8 inches square.
 2. Step coats on Samples to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.
- G. Product List: Submit each product indicated, include the following:
 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- H. Maintenance Materials: Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 1. Quantity: Furnish an additional 5 percent, but not less than 2 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

1.7 MOCK-UP

- A. Benchmark Samples (Mock-ups): Provide benchmark finish sample (all coats) for each coating type and substrate.
 1. Architect will select several rooms or surfaces to represent surfaces and conditions, for application of each paint system type and substrate; colors will be provided for Benchmark Samples.
 - a. Wall Surfaces: Complete minimum 100 square feet.
 - b. Small Areas and Items: Apply systems to items designated by the Architect.
 2. Complete Benchmark Samples per the requirements of this Section.
 - a. Provide required sheen, color and texture for each surface.
 - b. Architect-accepted Benchmark Samples to establish level of quality for remainder of Work.
 3. Architect to provide final color approvals from Benchmark Samples and intermediate coat wall colors; refer to subsection 3.3 of this Section.
 4. Benchmark samples to be prepared by individuals performing the remaining Work for this Project.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F and a maximum 90 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.9 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Benjamin Moore & Co.
- B. Behr Process Corporation.
- C. PPG Paints.
- D. Sherwin-Williams Company.
- E. McCormick Paints.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Interior wet-applied paints and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
- C. Colors:
 - 1. As selected by Architect from manufacturer's full range.
 - 2. Different colors may be used in the same room.
 - 3. Colors of frames may be different than doors.
 - 4. Colors for ceilings and trim may be different from walls, and walls may be more than one color or striped.
 - 5. Dark tints may be used on metal frames that may require more coats than that indicated on paint schedule for proper coverage; apply as many coats as necessary for complete hide.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. Use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- C. Seal surfaces that might cause bleed through or staining of topcoat.
- D. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- E. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- F. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas and cotton.
- G. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- H. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- I. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- J. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- K. Passivated Galvanized Steel: Clean with a water-based industrial strength cleaner, and/or "Brush Blast" in accordance with SSPC-SP7. After the surface has been prepared, apply

recommended primer to a small area. Allow primer to cure for 7 days, and test adhesion using the "cross-hatch adhesion tape test" method in accordance with ASTM D 3359. If the adhesion of the primer is positive, proceed with a recommended coating system for galvanized metal.

L. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

M. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

N. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 COLOR COORDINATION

- A. Tint intermediate coats for wall surfaces to match color sample selections.
- B. Architect will visit the Project within 7 days after notification, to review primed walls for final color coordination.
- C. Allow 3 week days in schedule for Architect to change final wall colors between intermediate coat and remaining coat(s).
- D. Allow time to order final paint colors; do not order final paint colors until obtaining final color approvals.

3.4 APPLICATION

- A. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Wall Surfaces: Receive final color approvals following Architect's review of Intermediate Coats, before proceeding.
 3. Omit primer over metal surfaces that have been shop primed and touchup painted.
 4. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 5. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- B. Apply paints according to manufacturer's written instructions.
 1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or

- surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
- a. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 5. Finish doors on tops, bottoms, and side edges the same as faces.
- C. Block Fillers:
1. Apply two coats of block filler to concrete masonry block at a rate to ensure complete coverage with pores filled.
 2. Perform a squeegee operation on second coat to fill all crevices and produce a smooth surface; do not remove filler material from surface with the squeegee operation.
- D. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
1. Wall Surfaces: Tint Prime Coat a lighter shade to facilitate identification; tint Prime Coat to match color of finish coat, but provide sufficient difference in shade to distinguish Prime Coat from Intermediate Coat used for final color selections.
 2. Other Surfaces: Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- F. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- G. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- H. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

- g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.
 - d. Exposed wiremold and conduit in all finished spaces to match color of wall.
- I. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following factory-finished components:
 - a. Architectural woodwork.
 - b. Acoustical wall panels.
 - c. Metal toilet enclosures.
 - d. Metal lockers.
 - e. Elevator entrance doors and frames.
 - f. Elevator equipment.
 - g. Finished mechanical and electrical equipment.
 - h. Light fixtures.
 - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Foundation spaces.
 - b. Furred areas.
 - c. Ceiling plenums.
 - d. Utility tunnels.
 - e. Pipe spaces.
 - f. Duct shafts.
 - g. Elevator shafts.
 - 3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper and copper alloys.
 - e. Bronze and brass.
 - 4. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
 - 5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
 - 6. Items indicated to receive other finishes.
 - 7. Items indicated to remain unfinished.
 - 8. Floors, unless specifically so indicated.
 - 9. Ceramic and other tiles.
 - 10. Acoustical materials, unless specifically so indicated.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINT SCHEDULE

- A. Concrete and Masonry Other Than Concrete Masonry Units:
 - 1. Semi-Gloss Sheen:
 - a. Benjamin Moore & Co.:
 - 1) Primer (Unpainted Surfaces): Ultra Spec Masonry Int/Ext Acrylic Sealer (608).
 - 2) First and Second Coats: Ultra Spec 500 Waterborne Zero VOC Semi-Gloss N539.
 - b. Behr Process Corporation:
 - 1) Primer: Premium Plus Interior All-In-One Primer & Sealer, 75
 - 2) First and Second Coats: Behr Pro i300 Interior Semi-Gloss Paint, 370
 - c. PPG Paints:
 - 1) Primer (Unpainted Surfaces): Speedhide Zero Int. Latex Quick Drying Primer/Sealer, 6-4900XI.
 - 2) First and Second Coats: Speedhide Zero Interior Flat Latex, 6-4510XI.
 - d. Sherwin-Williams Company:
 - 1) Primer (Unpainted Surfaces): Loxon Concrete and Masonry Primer LX02 Series.
 - 2) First and Second Coats: ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2650 Series.
 - e. McCormick Paints:
 - 1) Primer (Unpainted Surfaces): Acrylok Interior/Exterior 100% Acrylic Masonry Primer 06451.
 - 2) First and Second Coats: McCormick Total Advantage Zero VOC Professional Coating Semi-Gloss 10 Series .
- B. Concrete Masonry Units:
 - 1. Semi-Gloss Sheen:
 - a. Benjamin Moore & Co.:
 - 1) Block Filler (Unpainted Surfaces) - 2 Coats: Ultra Spec Hi-Build Masonry Block Filler (571).
 - 2) First and Second Coats: Ultra Spec 500 Waterborne Interior Semi-Gloss N539.
 - b. Behr Process Corporation:
 - 1) Block Filler (Unfinished Surfaces) - 2 Coats: Behr Pro Block Filler Primer, 50
 - 2) First and Second Coats: Behr Pro i300 Interior Semi-Gloss Paint, 370
 - c. PPG Architectural Coatings; Glidden Professional:
 - 1) Block Filler (Unpainted Surfaces) - 2 Coats: Concrete Coatings Interior/Exterior Block Filler 3010.
 - 2) First and Second Coats: Ultra-Hide No VOC Semi-Gloss Paint 1415.

- d. PPG Architectural Coatings; PPG Paints:
 - 1) Block Filler (Unpainted Surfaces) - 2 Coats: Speedhide Latex Block Filler 6-15XI.
 - 2) First and Second Coats: Speedhide Zero Interior Semi-Gloss Latex Enamel, 6-4510XI Series.
 - e. Sherwin-Williams Company:
 - 1) Block Filler (Unpainted Surfaces) - 2 Coats: PrepRite Latex Block Filler B25W25.
 - 2) First and Second Coats: ProMar 200 Zero VOC Interior Latex S/G, B31-2650 Series.
 - f. McCormick Paints:
 - 1) Block Filler (Unpainted Surfaces) - 2 Coats: McCormick Interior/Exterior Latex Block Filler 01015.
 - 2) First and Second Coats: McCormick Total Advantage Zero VOC Professional Coating Semi-Gloss 10 Series.
- C. Gypsum Board:
- 1. Flat Sheen: Ceilings.
 - a. Benjamin Moore & Co.:
 - 1) Primer (Unpainted Surfaces): Ultra Spec 500 Waterborne Zero VOC Primer Sealer N534.
 - 2) First and Second Coats: Ultra Spec 500 Waterborne Zero VOC Flat N536.
 - b. Behr Process Corporation:
 - 1) Primer (Unpainted Surfaces) Interior Drywall Primer & Sealer, 73
 - 2) First and Second Coats: Behr Pro i300 Interior Flat Paint, 310
 - c. PPG Paints:
 - 1) Primer (Unpainted Surfaces): Speedhide Zero Int. Latex Quick Drying Primer/Sealer, 6-4900XI.
 - 2) First and Second Coats: Speedhide Zero Interior Flat Latex 1, 6-4110XISeries.
 - d. Sherwin-Williams Company:
 - 1) Primer (Unpainted Surfaces): ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
 - 2) First and Second Coats: ProMar 200 Zero VOC Interior Latex Flat, B30-2650 Series.
 - e. McCormick Paints:
 - 1) Primer (Unpainted Surfaces): McCormick 1st Step Interior Vinyl Primer Sealer 06431.
 - 2) First and Second Coats: McCormick Total Advantage Zero VOC Professional Coating Flat 08 Series.
 - 2. Low-Luster, Satin or Eggshell Sheen:
 - a. Benjamin Moore & Co.:
 - 1) Primer (Unfinished Surfaces): Ultra Spec 500 Waterborne Interior Primer Sealer N534.
 - 2) First and Second Coats: Ultra Spec 500 Waterborne Zero VOC Eggshell Enamel N538.
 - b. Behr Process Corporation:
 - 1) Primer (Unpainted Surfaces) Interior Drywall Primer & Sealer, 73
 - 2) First and Second Coats: Behr Pro i300 Interior Eggshell Paint, 330
 - c. PPG Paints:

- 1) Primer (Unfinished Surfaces): Speedhide Zero Latex Quick Drying Primer/Sealer, 6-4900XI.
 - 2) First and Second Coats: Speedhide Zero Interior Eggshell Latex 6-4310XI Series.
 - d. Sherwin-Williams Company:
 - 1) Primer (Unfinished Surfaces): ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
 - 2) First and Second Coats: ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-2650 Series.
 - e. McCormick Paints:
 - 1) Primer (Unpainted Surfaces): McCormick 1st Step Interior Vinyl Primer Sealer 06431.
 - 2) First and Second Coats: McCormick Total Advantage Zero VOC Professional Coating Eggshell 09 Series.
- D. Woodwork and Hardboard - Painted:
1. Semi-Gloss Sheen:
 - a. Benjamin Moore & Co.:
 - 1) Undercoat (Unfinished Surfaces): Fresh Start 100% Acrylic Superior Primer 023.
 - 2) First and Second Coats: Ultra Spec 500 Waterborne Interior Zero VOC Semi-Gloss 539.
 - b. Behr Process Corporation:
 - 1) Primer (Unpainted Surfaces) Interior All-In-One Primer & Sealer, 75
 - 2) First and Second Coats: Behr Pro i300 Interior Semi-Gloss Paint, 370
 - c. PPG Architectural Coatings; PPG Paints:
 - 1) Undercoat (Unfinished Surfaces): 17-921 Seal Grip Interior/Exterior Acrylic Universal Primer
 - 2) First and Second Coats: Speedhide Zero Interior Semi-Gloss Latex Enamel, 6-4510XI Series.
 - d. Sherwin-Williams Company:
 - 1) Undercoat (Unfinished Surfaces): Multi-Purpose Waterbased Acrylic-Alkyd Primer B79-450.
 - 2) First and Second Coats: ProMar 200 Zero VOC Interior Latex S/G, B31-2600 Series; or Pro Industrial Acrylic Coating S/G B66-650 (Doors & Frames).
 - e. McCormick Paints:
 - 1) Undercoat (Unpainted Surfaces): McCormick 1st Step Interior Latex Enamel Undercoater and Primer Sealer 06441.
 - 2) First and Second Coats: McCormick Total Advantage Zero VOC Professional Coating Semi-Gloss 10 Series.
- E. Mechanical and Electrical Items: Use 3-coat system best suited to substrate, satin finish. Use heat resistant materials where required.
- F. Ferrous Metal:
1. Semi-Gloss Sheen:
 - a. Benjamin Moore & Co.:
 - 1) Primer (Unfinished Surfaces): Ultra Spec HP Acrylic Metal Primer HP04.
 - 2) First and Second Coats: Ultra Spec 500 Waterborne Interior Semi-Gloss 539.
 - b. Behr Process Corporation:
 - 1) Primer (Unfinished Surfaces): Premium Plus Multi-Surface Primer, 436
 - 2) First and Second Coats: Behr Pro i300 Interior Semi-Gloss Paint, 370

- c. PPG Paints:
 - 1) Primer (Unfinished Surfaces): Pitt Tech Plus 4020 PF
 - 2) First and Second Coats: Speedhide Zero Interior Semi-Gloss Latex Enamel, 6-4510XI Series.
 - d. Sherwin-Williams Company:
 - 1) Primer (Unfinished Surfaces): Pro-Cryl Universal Primer, B66-1310 Series.
 - 2) First and Second Coats: ProMar 200 Latex Gloss, B11-2200 Series; or Pro Industrial Acrylic Coating S/G, B66-650 (Doors & Frames).
 - e. McCormick Paints:
 - 1) Primer (Unfinished Surfaces): Corotech Acrylic Metal Primer V110.
 - 2) First and Second Coats: McCormick Interlok Interior/Exterior Acrylic Semi-Gloss Urethane DTM 45 Series or comparable product; VOC limit must be compliant to LEED.
- G. Zinc-Coated (Galvanized) Metal:
- 1. Semi-Gloss Sheen:
 - a. Benjamin Moore & Co.:
 - 1) Primer (Unfinished Surfaces): Ultra Spec HP Acrylic Metal Primer HP04.
 - 2) First and Second Coats: Ultra Spec 500 Waterborne Interior Semi-Gloss 539.
 - b. Behr Process Corporation:
 - 1) Primer (Unfinished Surfaces): Premium Plus Multi-Surface Primer, 436
 - 2) First and Second Coats: Behr Pro i300 Interior Semi-Gloss Paint, 370
 - c. PPG Paints:
 - 1) Primer (Unfinished Surfaces): Pitt Tech Plus 4020PF
 - 2) First and Second Coats: Speedhide Zero Interior Semi-Gloss Latex Enamel, 6-4510XI Series.
 - d. Sherwin-Williams Company:
 - 1) Primer (Unfinished Surfaces): ProCryl Universal Primer, B66-1310 Series.
 - 2) First and Second Coats: ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series.
 - e. McCormick Paints:
 - 1) Primer (Unfinished Surfaces): McCormick Underlok Interior/Exterior Acrylic Latex Multi Purpose Primer 06452.
 - 2) First and Second Coats: McCormick Interlok Interior/Exterior Acrylic Semi-Gloss Urethane DTM 45 Series or comparable product; VOC limit must be compliant to LEED.
- H. Overhead Exposed Construction (Deck, Joists, Steel): One coat flat dry fallout coating system to cover formulated for compatibility with all substrates by any paint manufacturer specified in this Section. Use 100 percent acrylic, flash-rust-resistance dryfall.
- 1. Benjamin Moore & Co.: Benjamin Moore Latex Dry Fall- Flat (395).
 - 2. Behr: Behr Pro Dryfall Paint Flat, 890
 - 3. PPG Paints: Speedhide Super Tech WB Interior 100% Acrylic Dry-Fog Latex 6-724XI, 6-725XI.
 - 4. Sherwin-Williams Company: Pro Industrial Waterborne Acrylic Dryfall Flat, B42W00181.
 - 5. McCormick Paints: Interior Waterborne Acrylic Dry Fall; VOC limit must be compliant to LEED.
- I. Wood Fiber Acoustical Panels (Eggshell): One coat.
- 1. Benjamin Moore & Co.: Benjamin Moore Latex Dry Fall Eggshell (396).
 - 2. Behr: Behr Pro i300 Interior Eggshell Paint, 330

3. PPG Architectural Coatings; PPG Paints: Speedhide Zero Interior Eggshell Latex Enamel, 6-4310XI Series.
 4. Sherwin-Williams Company: Pro Industrial Waterborne Acrylic Dryfall Eg-Shel, B42W00082.
 5. McCormick Paints: McCormick Total Advantage Zero VOC Professional Coating Eggshell 09 Series .
- J. Cotton or Canvas Insulation-Covering Substrates, Including Pipe and Duct Coverings:
1. Benjamin Moore & Co.:
 - a. Primer: Ultra Spec 500 Interior Zero VOC Latex Primer N534.
 - b. First and Second Coats: Ultra Spec 500 Interior Zero VOC Latex Eggshell, N538.
 2. Behr Process Corporation:
 - a. Primer: Kilz 2 Interior/Exterior Water-Base Primer, 2000
 - b. First and Second Coats: Behr Pro i300 Interior Eggshell Paint, 330
 3. PPG Paints:
 - a. Primer: Speedhide Zero Int. Latex Quick Drying Primer/Sealer, 6-4900XI.
 - b. First and Second Coats: Speedhide Zero Interior Eggshell Latex Enamel, 6-4310XI Series.
 4. Sherwin-Williams Company:
 - a. Primer: Multi-Purpose Latex Primer B51-450
 - b. First and Second Coats: ProMar 200 Zero VOC Latex Eg-Shel, B202600 Series.
 5. McCormick Paints:
 - a. Top Coat: McCormick Total Advantage Zero VOC Professional Coating Eggshell 09 Series.
- K. Exposed PVC Piping:
1. Benjamin Moore & Co.:
 - a. Bond Coat: STIX Waterborne Bonding Primer SXA-110; Insl-X.
 - b. First and Second Coats: Ultra Spec 500 Interior Zero VOC Latex Eggshell, 538.
 2. Behr Process Corporation:
 - a. Primer: Kilz Adhesion Interior/Exterior Water-Base Bonding Primer, 2111
 - b. First and Second Coats: Behr Pro i300 Interior Eggshell Paint, 330
 3. PPG Paints:
 - a. Bond Coat: SEAL GRIP 17-921 Interior/Exterior 100% Acrylic Universal Primer/Sealer.
 - b. First and Second Coats: Speedhide Zero Interior Eggshell Latex Enamel, 6-4310XI Series.
 4. Sherwin-Williams Company:
 - a. Bond Coat: Zero VOC Multi Purpose Primer B 51-450 Series.
 - b. First and Second Coats: ProMar 200 Zero VOC Latex Eg-Shel, B202600 Series.
 5. McCormick Paints:
 - a. Prime Coat: McCormick Underlok Interior/Exterior Acrylic Latex Multi Purpose Primer 06452.
 - b. Top Coat: McCormick Total Advantage Zero VOC Professional Coating Eggshell 09 Series.

END OF SECTION

SECTION 09 93 00 - STAINING AND TRANSPARENT FINISHING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. This Section includes surface preparation and the application of wood finishes on the following substrates:
 - 1. Interior Substrates:
 - a. Dressed lumber (finish carpentry).
 - b. Exposed wood panel products.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures, project meetings, progress schedules and documentation, reports, coordination.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each type of product indicated.
- C. Samples for Initial Selection: For each type of product indicated
- D. Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.
 - 1. Submit Samples on representative samples of actual wood substrates, 8 inches square.
 - 2. Label each Sample for location and application area.
- E. Product List: For each product indicated, include the following:
 - 1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- F. LEED Submittals: Comply with Section 018113.
 - 1. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied paints and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - a. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

- A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Benjamin Moore & Co.
- B. Cabot.
- C. PPG Paints.
- D. Sherwin-Williams Company.
- E. Behr Process Corporation.

2.2 MATERIALS, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.
- B. Stain Colors: Match Architect's samples.
- C. Interior wet-applied paints and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."

2.3 WOOD FILLERS

- A. Wood Filler Paste: As recommended by finish manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
 - 1. Maximum Moisture Content of Wood Substrates: 15 percent when measured with an electronic moisture meter.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.
 - 3. Begin finish application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 4. Beginning application of finish system constitutes Contractor's acceptance of substrate and conditions.

3.2 PREPARATION

- A. Remove plates, machined surfaces, and similar items already in place that are not to be finished. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
 - 1. After completing finishing operations, reinstall items that were removed; use workers skilled in the trades involved. Remove surface-applied protection if any.
- B. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.

2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
3. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.

C. Apply wood filler paste to open-grain woods, to produce smooth, glasslike finish.

3.3 APPLICATION

A. Apply in accordance with manufacturer's instructions.

1. Use applicators and techniques suited for finish and substrate indicated.
2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

A. Wood Substrates: Wood trim, architectural woodwork.

1. Water-Based Varnish over Stain System:

a. Stain Coat: Stain, semitransparent, for interior wood.

- 1) Old Masters Water-Based Wood Stain; Old Masters.
- 2) DFT 300 Deft Interior Water Based Wood Stain <250 gpl VOC; PPG Architectural Coatings, PPG Paints.
- 3) Minwax Performance Series 250 V.O.C. Compliant WoodFinish Interior Penetrating Stain 7250 Series; Sherwin-Williams Company.

b. Intermediate Coat: Water-based varnish matching topcoat.

c. Topcoat: Varnish, water based, clear, satin.

- 1) Benwood Stays Clear Acrylic Polyurethane Low Lustre 423; Benjamin Moore & Co.
- 2) Old Masters Water-Based Polyurethane Satin; Old Masters.
- 3) DFT159 Deft Polyurethane Interior Water Based Satin; PPG Architectural Coatings, PPG Paints.
- 4) WoodClassics Waterborne Polyurethane Varnish - Gloss A68V91 (first coat)/Satin A68F90 (second coat); Sherwin-Williams Company.

d. Topcoat: Varnish, water based, clear, semi-gloss.

- 1) Old Masters Water-Based Polyurethane Semi-Gloss; Old Masters.
- 2) DFT 158 Deft Polyurethane Interior Water Based Semi-Gloss; PPG Architectural Coatings, PPG Paints.

e. Topcoat: Varnish, water based, clear, gloss.

- 1) Old Masters Water-Based Polyurethane Gloss; Old Masters.

- 2) DFT 157 Deft Polyurethane Interior Water Based Gloss; PPG Architectural Coatings, PPG Paints.
2. Water-Based Varnish System:
 - a. Prime Coat: Water-based varnish matching topcoat.
 - b. Topcoat: Varnish, water based, clear, satin.
 - 1) Benwood Stays Clear Acrylic Polyurethane Low Lustre 423; Benjamin Moore & Co.
 - 2) Old Masters Water-Based Polyurethane Satin; Old Masters.
 - 3) DFT159 Deft Polyurethane Interior Water Based Satin; PPG Architectural Coatings, PPG Paints.
 - 4) WoodClassics Waterborne Polyurethane Varnish - Gloss A68V91 (first coat)/Satin A68F90 (second coat); Sherwin-Williams Company.
 - c. Topcoat: Varnish, water based, clear, semi-gloss.
 - 1) Old Masters Water-Based Polyurethane Semi-Gloss; Old Masters.
 - 2) DFT158 Deft Polyurethane Interior Water Based Semi-Gloss; PPG Architectural Coatings, PPG Paints.
 - d. Topcoat: Varnish, water based, clear, gloss.
 - 1) Old Masters Water-Based Polyurethane Gloss; Old Masters.
 - 2) DFT157 Deft Polyurethane Interior Water Based Gloss; PPG Architectural Coatings, PPG Paints.

END OF SECTION

SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. This Section includes surface preparation and application of high-performance coating systems on the following substrates:
 - 1. Interior Substrates:
 - a. Concrete masonry units (CMU).
 - b. Gypsum board.
 - 2. Exterior Substrates:
 - a. Exposed concrete designated for painted finish.
 - b. Concrete masonry units (CMU).
 - c. Exposed steel canopy structure and other rooftop structures.
 - d. Exposed angle lintels and hung plates.
 - 3. All substrates listed in the schedule at the end of this Section may not be required for this project.

1.2 DEFINITIONS

- A. Gloss Ranges:
 - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
 - 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 - 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 - 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each type of product indicated.
- C. Samples for Initial Selection: For each type of finish-coat product indicated.
- D. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.
 - 1. Submit Samples on rigid backing, minimum 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- E. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- F. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For paints and coatings, if applicable: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 4: BPDO - Material Ingredients
 - a. For paints and coatings, if applicable: Material Ingredient Report.

3. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied paints and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
- G. LEED Submittals: For Credit EQ 4.2, manufacturers' product data for interior coatings, including printed statement VOC content; requirements of coating systems for high humidity areas differ from normal-conditioned spaces.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - a. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

1.5 MOCK-UP

- A. Benchmark Samples (Mock-ups): Provide benchmark finish sample (all coats) for each coating type and substrate.
 1. Architect will select several rooms or surfaces to represent surfaces and conditions, for application of each paint system type and substrate; colors will be provided for Benchmark Samples.
 - a. Wall Surfaces: Complete minimum 100 square feet.
 - b. Small Areas and Items: Apply systems to items designated by the Architect.
 2. Complete Benchmark Samples per the requirements of this Section.
 - a. Provide required sheen, color and texture for each surface.
 - b. Architect-accepted Benchmark Samples to establish level of quality for remainder of Work.
 3. Architect to provide final color approvals from Benchmark Samples and intermediate coat wall colors; refer to subsection 3.3 of this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Benjamin Moore & Co.

- B. Tnemec Company, Inc.
- C. International Paint LLC.
- D. PPG Paints.
- E. Sherwin-Williams Company.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. Provide products of same manufacturer for each coat in a coating system.
- B. Colors: As selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
 - 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Masonry (CMU): 12 percent.
 - b. Gypsum Board: 12 percent.
 - c. Concrete: 12 percent.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 4. Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
- D. CMU Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- E. Steel Substrates: Remove rust and loose mill scale.
 - 1. Clean using methods recommended in writing by coating manufacturer.
 - 2. Blast clean according to SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

3.3 COLOR COORDINATION

- A. Tint intermediate coats for wall surfaces to match color sample selections.
- B. Architect will visit the Project within 7 days after notification, to review primed walls for final color coordination.
- C. Allow 3 week days in schedule for Architect to change final wall colors between intermediate coat and remaining coat(s).
- D. Allow time to order final paint colors; do not order final paint colors until obtaining final color approvals.

3.4 APPLICATION

- A. Apply in accordance with manufacturer's instructions.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 - 1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 - 2. Wall Surfaces: Receive final color approvals following Architect's review of Intermediate Coats, before proceeding.
 - 3. Omit primer over metal surfaces that have been shop primed and touchup painted.
 - 4. If undercoats or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 - 5. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Apply high-performance coatings according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for coating and substrate indicated.
 - 2. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
 - a. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 - 3. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 4. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- D. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

- E. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
 - 1. Wall Surfaces: Tint Prime Coat a lighter shade to facilitate identification; tint Prime Coat to match color of finish coat, but provide sufficient difference in shade to distinguish Prime Coat from Intermediate Coat used for final color selections.
 - 2. Other Surfaces: Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- F. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- G. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- H. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.
- I. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

3.5 CLEANING

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Concrete Substrates, Vertical Surfaces:
 - 1. Pigmented Polyurethane over Epoxy System (Gloss):
 - a. Benjamin Moore & Company:
 - 1) Prime Coat: Corotech Polyamide Epoxy V400.
 - 2) Intermediate Coat: Corotech Polyamide Epoxy V400.
 - 3) Topcoat - Gloss: Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
 - b. International Paint LLC:
 - 1) Prime Coat: Devran 203.
 - 2) Intermediate Coat: Devran 203.
 - 3) Topcoat - Gloss: Devthane 379 Series.
 - c. PPG Paints:
 - 1) Prime Coat: Amerlock 2 VOC Epoxy Coating.
 - 2) Intermediate Coat: Amerlock 2 VOC Epoxy Coating.

- 3) Topcoat - Gloss: Amershield VOC Acrylic Polyurethane
 - d. Sherwin-Williams Company:
 - 1) Prime Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy Finish, B73-300 Series. B73-300
 - 2) Intermediate Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy Finish, B73- 300 Series.
 - 3) Topcoat - Gloss: S-W Acrolon Waterbased Acrolon 100 WB Urethane.
 - e. Tnemec Company, Inc.:
 - 1) Prime Coat: Series 27 W.B. Typoxy.
 - 2) Intermediate Coat: Series 27 W.B. Typoxy.
 - 3) Topcoat - Semi-Gloss: Series 1081 Endura-Shield.
 - 4) Topcoat - Gloss: Series 1080 Endura-Shield.
- B. CMU Substrates:
- 1. Pigmented Polyurethane over High-Build Epoxy System - Gloss:
 - a. Benjamin Moore & Company:
 - 1) Block Filler: Corotech Epoxy Block Filler V163.
 - 2) Intermediate Coat: Corotech Polyamide Epoxy V400.
 - 3) Topcoat: Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
 - b. International Paint LLC:
 - 1) Prime Coat: Tru-Glaze-WB 4015.
 - 2) Intermediate Coat: Bar-Rust 231 Series.
 - 3) Topcoat - Gloss: Devthane 379 Series.
 - c. PPG Paints:
 - 1) Prime Coat: Amercoat 68HS VOC Zinc Rich Epoxy Primer.
 - 2) Intermediate Coat: Amerlock 2 VOC Epoxy Coating.
 - 3) Topcoat: Amershield VOC Acrylic Polyurethane.
 - d. Sherwin-Williams Company:
 - 1) Prime Coat: Epoxy, S-W Cement Plex 875 Acrylic Block Filler.
 - 2) Intermediate Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy B73-300 Series.
 - 3) Topcoat - Gloss: S-W Acrolon Waterbased Acrolon 100 WB Urethane.
 - e. Tnemec Company, Inc.:
 - 1) Prime Coat: Series 1254 EpoxoBlock WB.
 - 2) Intermediate Coat: Series 27 W.B. Typoxy.
 - 3) Topcoat - Semi-Gloss: Series 287 Enviro-Pox.
 - 4) Topcoat - Gloss: Series 297 Enviro-Glaze.
- C. Steel Substrates: Exposed structural steel, rooftop structures, angle lintels and hung plate substrates.
- 1. Pigmented Polyurethane over Zinc-Rich Primer System:
 - a. Benjamin Moore & Company:
 - 1) Prime Coat: Corotech Organic Zinc Rich Primer V170.
 - 2) Intermediate Coat: Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
 - 3) Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
 - b. Devoe Coatings:
 - 1) Prime Coat: Cathacoat 302H.
 - 2) Intermediate Coat: Bar-Rust 231 Series.
 - 3) Topcoat - Gloss: Devthane 379.
 - c. International Paint LLC:

- 1) Prime Coat: Cathacoat 302H.
 - 2) Intermediate Coat: Bar-Rust 231 Series.
 - 3) Topcoat - Gloss: Devthane 379 Series.
 - d. PPG Paints:
 - 1) Prime Coat: Amercoat 68HS VOC Zinc Rich Epoxy Primer.
 - 2) Intermediate Coat: Amerlock 2 VOC Epoxy Coating.
 - 3) Topcoat: Amershield VOC Acrylic Polyurethane.
 - e. Sherwin-Williams Company:
 - 1) Prime Coat: S-W Zinc Clad XI WB Inorganic Zinc-Rich Coating.
 - 2) Intermediate Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy B73-300 Series.
 - 3) Topcoat: S-W Acrolon Waterbased Acrolon 100 WB Urethane Gloss Enamel.
 - f. Tnemec Company, Inc.:
 - 1) Prime (Shop) Coat: Series 94H2O Hydro Zinc. Refer to applicable Division 05 Section.
 - 2) Intermediate Coat: Series 27 W.B. Typoxy.
 - 3) Topcoat - Gloss: Gold Standard Fluoropolymer Series V1070.
- D. Galvanized-metal substrates should not be chromate passivated if primers are field applied. If galvanized metal is chromate passivated, consult manufacturers for appropriate surface preparation and primers.
- E. Galvanized-Metal Substrates:
1. Pigmented Polyurethane over Epoxy Primer System:
 - a. Benjamin Moore & Company:
 - 1) Prime Coat: Corotech Waterborne Bonding Primer V175.
 - 2) Intermediate Coat: Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
 - 3) Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
 - b. International Paint LLC:
 - 1) Prime Coat: Devran 203.
 - 2) Intermediate Coat: Devthane 379 Series.
 - 3) Topcoat: Devthane 379 Series.
 - c. PPG Paints:
 - 1) Prime Coat: Amerlock 2 VOC.
 - 2) Intermediate Coat: Amerlock 2 VOC.
 - 3) Topcoat: Amershield VOC Acrylic Polyurethane.
 - d. Sherwin-Williams Company:
 - 1) Prime Coat: Pro Cryl Universal Primer B66-1310 or, for high abrasion areas: DTM Wash Primer B71Y00001.
 - 2) Intermediate Coat: Pro Industrial Waterbased Catalyzed Epoxy B73-300 Series.
 - 3) Topcoat: S-W Acrolon Waterbased Acrolon 100 WB Urethane Gloss Enamel.
 - e. Tnemec Company, Inc.:
 - 1) Prime Coat: Series 27 W.B. Typoxy.
 - 2) Intermediate Coat: Series 27 W.B. Typoxy.
 - 3) Topcoat - Gloss: 1080 Endura-Shield.

3.7 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Concrete Substrates, Vertical Surfaces:
1. Epoxy-Modified Latex System:
 - a. Benjamin Moore & Company:
 - 1) Prime Coat: Super Spec Waterborne Latex Block Filler 160.

- 2) Intermediate Coat: Epoxy-modified latex, matching topcoat.
 - 3) Topcoat - Semi-gloss: Super Spec HP Acrylic Epoxy Semi-Gloss Catalyzed P43.
 - b. Benjamin Moore & Company; Corotech Line:
 - 1) Prime Coat: Corotech Epoxy Block Filler V163.
 - 2) Intermediate Coat: Corotech Waterborne Amine Epoxy Coating V440.
 - 3) Topcoat - Semi-gloss: Corotech Waterborne Amine Epoxy Coating V440.
 - c. International Paint LLC:
 - 1) Prime Coat: Tru-Glaze WB 4015 (squeegee into bugholes).
 - 2) Intermediate Coat: Match topcoat.
 - 3) Topcoat - Semi-Gloss: Tru-Glaze WB 4426.
 - d. PPG Paints:
 - 1) Prime Coat: Pitt Glaze WB 16-90 Epoxy Block Filler.
 - 2) Intermediate Coat: Epoxy-modified latex, matching topcoat.
 - 3) Topcoat - Semi-gloss: Pitt Glaze WB 1 16-510 Series Water Based Pre-catalyzed Acrylic Epoxy.
 - e. Sherwin-Williams Company:
 - 1) Prime Coat: Cement Plex 875 WB Epoxy Block Filler (high moisture areas), or S-W Loxon Block Surfacer, LX01 Series.
 - 2) Intermediate Coat: Epoxy-modified latex, matching topcoat.
 - 3) Topcoat - Gloss: Pro Industrial Water Based Catalyzed Epoxy EG B 73-300Series.
 - f. Tnemec Company, Inc.:
 - 1) Prime Coat: Series 1254 EpoxoBlock WB.
 - 2) Intermediate Coat: Series 27 W.B. Typoxy.
 - 3) Topcoat - Semi-Gloss: Series 287 Enviro-Pox.
- B. CMU Substrates:
1. Epoxy-Modified Latex System:
 - a. Benjamin Moore & Company:
 - 1) Super Spec Waterborne Latex Block Filler 160.
 - 2) Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
 - 3) Topcoat - Semi-gloss: Super Spec HP Acrylic Epoxy Semi-Gloss Catalyzed P43.
 - b. Benjamin Moore & Company; Corotech Line:
 - 1) Prime Coat: Corotech Epoxy Block Filler V163.
 - 2) Intermediate Coat: Corotech Waterborne Amine Epoxy Coating V440.
 - 3) Topcoat - Gloss: Corotech Waterborne Amine Epoxy Coating V440
 - c. International Paint LLC:
 - 1) Prime Coat: Tru-Glaze WB 4015.
 - 2) Intermediate Coat: Matching topcoat.
 - 3) Topcoat - Gloss: Tru-Glaze WB 4428.
 - d. PPG Architectural Coatings, PPG Paints:
 - 1) Prime Coat: Pitt Glaze WB 16-90 Epoxy Block Filler.
 - 2) Intermediate Coat: Epoxy-modified latex, matching topcoat.
 - 3) Topcoat - Semi-gloss: Pitt Glaze WB 16-510 Series Pre-Catalyzed Acrylic Water Based Epoxy.
 - e. Sherwin-Williams Company:
 - 1) Prime Coat: Cement Plex 875 WB Epoxy Block Filler (high moisture areas), or S-W Loxon Block Surfacer, A24W200.

- 2) Intermediate Coat: Epoxy-modified latex, matching topcoat.
 - 3) Topcoat - Gloss: Pro Ind. Water Based Catalyzed Epoxy Gloss B73-300 Series.
 - f. Tnemec Company:
 - 1) Prime Coat: Series 1254 EpoxoBlock WB.
 - 2) Intermediate Coat: Series 27 W.B. Typoxy.
 - 3) Topcoat - Gloss: Series 297 Enviro-Glaze.
- C. Steel Substrates:
1. Epoxy-Modified Latex System: Low contact/low traffic areas such as, but not limited to structural steel, overhead decking, pipes, ducts, etc., as scheduled.
 - a. Benjamin Moore & Company:
 - 1) Prime Coat: Corotech Acrylic Metal Primer V110.
 - 2) Intermediate Coat: Corotech Waterborne Amine Epoxy Coating V440.
 - 3) Topcoat: Corotech Waterborne Amine Epoxy Coating V440.
 - b. International Paint LLC:
 - 1) Prime Coat: Devran 203.
 - 2) Intermediate Coat: Tru-Glaze WB 4426.
 - 3) Topcoat: Tru-Glaze WB 4428.
 - c. PPG Paints:
 - 1) Prime Coat: Amerlock 2 VOC Epoxy
 - 2) Intermediate Coat: Amerlock 2 VOC Epoxy
 - 3) Topcoat - Gloss: Amerlock 2 VOC Epoxy
 - d. Sherwin-Williams Company:
 - 1) Prime Coat: S-W Pro Cryl Universal Metal Primer B66-310 Series.
 - 2) Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
 - 3) Topcoat - Gloss: Pro Ind. S-W Water Based Catalyzed Epoxy Gloss B73-300 Series.
 - e. Tnemec Company, Inc.:
 - 1) Prime Coat: Series 27 W.B. Typoxy.
 - 2) Intermediate Coat: Series 27 W.B. Typoxy.
 - 3) Topcoat - Gloss: Series 297 Enviro-Glaze.
 2. Pigmented Polyurethane over Zinc-Rich and Epoxy System: High contact/high traffic areas such as, but not limited to doors, railings, frames, pipes, etc.
 - a. Benjamin Moore & Company:
 - 1) Prime Coat: Corotech Organic Zinc Rich Primer V170.
 - 2) Intermediate Coat: Corotech Polyamide Epoxy Primer V150.
 - 3) Topcoat - Gloss: Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
 - b. International Paint LLC:
 - 1) Prime Coat: Catha-Coat 302H.
 - 2) Intermediate Coat: Bar-Rust 231 Series.
 - 3) Topcoat - Gloss: Devthane379 Series.
 - c. PPG Paints:
 - 1) Prime Coat: Amercoat 68HS VOC Zinc Rich Epoxy Primer.
 - 2) Intermediate Coat: Amerlock 2 VOC Epoxy Coating.
 - 3) Topcoat: Amershield VOC Acrylic Polyurethane.
 - d. Sherwin-Williams Company:
 - 1) Prime Coat: S-W Zinc Clad XI WB Inorganic Zinc-Rich Coating.
 - 2) Intermediate Coat: S-W Acrolon Waterbased Acrolon 100 WB Urethane.
 - 3) Topcoat: S-W Acrolon Waterbased Acrolon 100 WB Urethane.

- e. Tnemec Company, Inc.:
 - 1) Prime (Shop) Coat: Series 94H2O Hydro-Zinc. Refer to applicable Division 05 Sections.
 - 2) Intermediate Coat: Series 287 Enviro-Pox.
 - 3) Topcoat - Gloss: Series 297 Enviro-Glaze.
- D. Galvanized-metal substrates should not be chromate passivated if primers are field applied. If galvanized metal is chromate passivated, consult manufacturers for appropriate primers.
- E. Galvanized-Metal Substrates:
 - 1. Epoxy over Epoxy Primer System: Low contact/low traffic areas such as, but not limited to structural steel, overhead decking, pipes, ducts, etc., as scheduled.
 - a. Benjamin Moore & Company:
 - 1) Prime Coat: Corotech Polyamide Epoxy Primer V150.
 - 2) Intermediate Coat: Epoxy, matching topcoat.
 - 3) Topcoat Gloss: Corotech Polyamide Epoxy V400.
 - b. PPG Paints:
 - 1) Prime Coat: Amerlock 2 VOC Epoxy
 - 2) Intermediate Coat: Amerlock 2 VOC Epoxy
 - 3) Topcoat - Gloss: Amerlock 2 VOC Epoxy
 - c. International Paint LLC:
 - 1) Prime Coat: Devran 203.
 - 2) Intermediate Coat: Devran 224V.
 - 3) Topcoat: Devran 224V.
 - d. Tnemec Company, Inc.:
 - 1) Prime Coat: Series 27 W.B. Typoxy.
 - 2) Intermediate Coat: Series 27 W.B. Typoxy.
 - 3) Topcoat Gloss: Series Series 297 Enviro-Glaze.
 - 2. Pigmented Polyurethane over Epoxy Primer System: High contact/high traffic areas such as, but not limited to doors, frames, railings, pipes, etc.
 - a. Benjamin Moore & Company:
 - 1) Prime Coat: Corotech Organic Zinc Rich Primer V170.
 - 2) Intermediate Coat: Corotech Polyamide Epoxy Primer V150.
 - 3) Topcoat Gloss: Corotech Aliphatic Acrylic Urethane Coating Gloss V500.
 - b. International Paint LLC:
 - 1) Prime Coat: Devran 203.
 - 2) Intermediate Coat: Devran 203.
 - 3) Topcoat - Gloss: Devthane379 Series.
 - c. PPG Architectural Coatings, PPG Paints:
 - 1) Prime Coat: Amerlock 2 VOC Epoxy
 - 2) Intermediate Coat: Amerlock 2 VOC Epoxy
 - 3) Topcoat - Gloss: Amershield VOC Acrylic Polyurethane
 - d. Sherwin-Williams Company:
 - 1) Prime Coat: DTM Wash Primer B71Y1.
 - 2) Intermediate Coat: S-W Acrolon Waterbased Acrolon 100 WB Urethane.
 - 3) Topcoat - Gloss: Acrolon Waterbased Acrolon 100 WB Urethane.
 - e. Tnemec Company, Inc.:
 - 1) Prime Coat: Series 27 W.B. Typoxy.
 - 2) Intermediate Coat: Series 27 W.B. Typoxy.

3) Topcoat - Gloss: Series 297 Enviro-Glaze.

F. Gypsum Board Substrates:

1. Epoxy-Modified Latex System:
 - a. Benjamin Moore & Company:
 - 1) Prime Coat: Insl-X Aqua Lock Plus AQ-0400.
 - 2) Intermediate Coat: Pre-Catalyzed Waterborne Wall Epoxy Semi-Gloss V341.
 - 3) Topcoat Pre-Catalyzed Waterborne Wall Epoxy Semi-Gloss V341.
 - b. International Paint LLC:
 - 1) Prime Coat: Tru-Glaze WB 4030.
 - 2) Intermediate Coat: Match topcoat.
 - 3) Topcoat - Semi-Gloss: Tru-Glaze 4426.
 - c. PPG Paints:
 - 1) Prime Coat: SPEEDHIDE Zero 6-4900XI Interior Latex Sealer Quick-Drying.
 - 2) Intermediate Coat: Epoxy-modified latex, matching topcoat.
 - 3) Topcoat - Semi-Gloss: Pitt Glaze WB 16-510 Series Pre-catalyzed Water Based Acrylic Epoxy.
 - d. Sherwin-Williams Company:
 - 1) Prime Coat: Pro Mar 200 Zero VOC Interior Latex Primer.
 - 2) Intermediate Coat: Epoxy-modified latex, matching topcoat.
 - 3) Topcoat - Gloss: Pro Ind. Water Based Catalyzed Epoxy B73-300 Series.
 - e. Tnemec Company, Inc.:
 - 1) Prime Coat: Series 151-1051 Elasto-Grip.
 - 2) Intermediate Coat: Series W.B. Typoxy.
 - 3) Topcoat - Semi-Gloss: Series 287 Tneme-Glaze.

END OF SECTION

SECTION 09 96 20 - GRAFFITI-RESISTANT COATINGS**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Surface applied anti-graffiti coatings with extended written warranty.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product literature, specifications and data sheet.
- B. Mock-Up or Test Panels: Before full-scale application, test products to be used on a mock-up or test panel.
 - 1. Apply products using manufacturer-approved application methods, determining actual requirements for surface preparation, coverage rate, number of coats, and application procedures.
 - 2. After 48 hours, review effectiveness of protection, compatibility with substrates, and ability to achieve desired results.
 - 3. Obtain approval by Architect and Owner of workmanship, color, and texture before proceeding with Work.
 - 4. Test Panels: Location selected by Architect; to remain in finished Work.

1.3 QUALITY ASSURANCE

- A. Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- B. Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- C. Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.
 - 1. Verify project requirements.
 - 2. Review installation and substrate conditions.
 - 3. Coordinate with other building subtrades.
 - 4. Review manufacturer's installation instructions and warranty requirements.
- D. Installer's Qualifications: Firm experienced in installation or application of systems similar in complexity to those required for this Project, plus the following:
 - 1. Acceptable to or licensed by manufacturer.
 - 2. Must have minimum 3 years' experience with systems.
 - 3. Must have successfully completed not less than 5 comparable scale projects using this system.
- E. Product Qualifications: The anti-graffiti coating shall meet the following requirements:
 - 1. Solvent: None, water-borne.
 - 2. VOC Content: less than 50 grams per liter.
 - 3. Cleaning Cycles: ASTM D 6578 "Standard Practice for Determination of Graffiti Resistance" minimum 25 cycles without loss of repellency.
 - 4. Breathability: ASTM D1653 greater than 95% water vapor transmission.
 - 5. Surface Appearance: No appreciable difference compared to non-coated surface.
 - 6. Excellent Ultraviolet light stability.
 - 7. Non-sacrificial type.
- F. Pre-Installation Meetings:

1. Before Application Installer and Manufacturer's Representative shall inspect surfaces to be treated, noting in writing to the Architect deficiencies or flaws in the substrate construction which would affect the performance or appearance of the coating.
2. Beginning of Application: Manufacturer's Representative shall assure utilization of proper equipment verify material quantities, and supervise material application techniques.

1.4 PROJECT CONDITIONS

- A. Environmental Requirements:
 1. Maintain ambient temperature above 40 degrees F during and 24 hours after installation.
 2. Do not proceed with application on materials if ice or frost is covering the substrate.
 3. Do not proceed with application if ambient temperature of surface exceeds 100 degree F.
 4. Do not proceed with the application of materials in rainy conditions or if heavy rain is anticipated with 4 hours after application.
- B. Sealer Coordination: Verify compatibility with curing compounds, patching materials, repair mortar, paints, sealants, to be used on masonry surfaces to ensure compatibility with the anti-graffiti coating.

1.5 WARRANTIES

- A. The system manufacture shall furnish the Owner a written single source performance warranty that the Anti-Graffiti Coating System will be free of defects related to workmanship or material deficiency for a 10 year period from the date of completion of the Work provided under this Section.
 1. All defective areas shall be retreated by the system manufacture as determined by the Owner or Architect.
- B. The Anti-Graffiti manufacturer shall be responsible for providing labor and material to reseal areas where coating effectiveness does not meet the specified limits.

PART 2 - PRODUCTS

2.1 AVAILABLE PRODUCTS

- A. Protectosil® Anti-Graffiti, Evonik Degussa Corporation; www.protectosil.com
- B. VandlGuardTEN System, Rainguard International, Inc.; www.rainguard.com

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 PREPARATION

- A. Protection: Install coverings to protect adjacent surfaces.
- B. Surfaces to receive sealer shall be cleaned of dirt, oil, graffiti, grease, laitance, and other contaminants. All other surfaces shall be cleaned by mid-pressure water (1500 psi) and commercial paint strippers. Pressure washing is the minimum cleaning that will be accepted, other methods, such as blastracking, mobile power scrubbing and sandblasting may be submitted.
- C. Remove dirt, dust and materials that will interfere with the proper and effective application of the anti-graffiti coating. It is the responsibility of the Contractor to prepare the surfaces of the GFRC as recommended by the anti-graffiti manufacturer.

- D. Check the compatibility of all caulking and patching material to be used with the anti-graffiti coating.
- E. Sealants, patching materials, and expansion joints shall have been installed and approved.

3.3 FIELD QUALITY CONTROL

- A. Before an anti-graffiti coating will be accepted a field test evaluation will be done. The cost of the field testing will be the responsibility of the Contractor. The Architect will approve the test area prior to starting the Project.
- B. The anti-graffiti coatings manufacturer must accept prepared surface terms of the warrantee prior to installation of coating system.

3.4 APPLICATION

- A. Product shall be applied as per manufacturer's application instructions and recommendations for this specific project.
- B. Surface residue shall be brushed out thoroughly until they completely penetrate into the surface.
- C. Work that does not conform to specified requirements shall be corrected and/or replaced as directed by the Architect at Contractor's expense without extension of time.

3.5 CLEANING

- A. Clean spillage from adjacent surfaces using materials and methods as recommended by anti-graffiti manufacturer.
- B. Remove protective coverings from adjacent surfaces when no longer needed.
- C. Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

SECTION 09 97 33 - CONCRETE FLOOR ENHANCEMENT**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes: Products and procedures for enhancing concrete floors into a finished surface and accessories indicated, specified, or required to complete usable finish.
- B. Locations: Exposed concrete floors designated for Sealed finish including, but not limited to, interior spaces designated CONC2 on Drawings.
- C. Coordinate with concrete trade for Work specified in other Division 3 sections, including concrete mix design, finishing and curing.
- D. Sequence of Work: Product specified within this Section is activated with water. Sequence application of product to not harm completed Work; product can be applied and activated prior to building enclosure.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required. Include manufacturer's technical data, application instructions, and recommendations.
 - 1. Indicate VOC content.
- B. LEED Submittals:
 - 1. Submit product data for each product including printed statement of VOC content.
- C. Maintenance Data: For inclusion in maintenance manual required by Division 01.
 - 1. Include instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.
 - 2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.3 QUALITY ASSURANCE

- A. Work of this section to be performed by same trade contractor performing the work of Section 03 35 19.
- B. Walkway Auditor: Certified by CPAA or NFSI to test bonded abrasive polished concrete floors for dynamic and static coefficient of friction according to ANSI B101.1 and B101.3.
- C. Coefficient of Friction: Achieve following coefficient of friction by field quality control testing in accordance to the following standards:
 - 1. ANSI B101.1 Static Coefficient of Friction - Achieve a minimum of .42 for level floor surfaces.
 - 2. ANSI B101.3 Dynamic Coefficient of Friction - Achieve a minimum of .35 for level floor surfaces.

PART 2 - PRODUCTS**2.1 LIQUID APPLIED PRODUCTS**

- A. Liquid Densifier: An Aqueous solution of Silicon Dioxide dissolved in one of the following Hydroxides that penetrates into the concrete surface and reacts with the Calcium Hydroxide to provide a permanent chemical reaction that hardens and densifies the wear surface of the cementitious portion of the concrete. All of the following have the same chemistry varying only by the alkali used for solubility of the Silicon Dioxide.

1. Basis-of-Design: Curecrete; Ashford Formula.
 2. L&M; Seal Hard.
 3. Euclid Chemical; EUCO Diamond Hard.
- B. Sealer - Impregnating Stain Protection: Non film forming stain and food resistant penetrating sealer designed to be applied to densified and polished concrete which meets the requirements of OSHA for slip resistance as tested by ASTM D 2047 and stain resistance of ASTM D 1308.
1. Basis-of-Design: Retro Guard.
 2. Scofield, a Sika Brand; SCOFIELD Formula One Guard-S.
 3. PROSOCO, Inc.; LSGuard.

2.2 ACCESSORIES

- A. Repair Material: A product that is designed to repair cracks and surface imperfections. The specified material must have sufficient bonding capabilities to adhere after the polishing to the concrete surface and provide abrasion resistance equal to or greater than the surrounding concrete substrate.
- B. Protective Cover: Skudoo Heavy Commercial Matt or Ram Board.

2.3 FINISHING EQUIPMENT

- A. Field Equipment:
1. A multiple head, counter rotating, walk behind or ride on machine, of various size and weights, with diamond tooling affixed to the head for the purpose of grinding concrete. Excludes janitorial maintenance equipment.
 2. Industrial auto scrubbers.
- B. Edge Equipment: Hand-held or walk-behind machines which produces same results, without noticeable differences, as field equipment.
- C. Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with sufficient head pressure of not less than 20 pounds to raise floor temperature by 20 degrees F.

PART 3 EXECUTION

3.1 PROCESS

- A. Perform all procedures to ensure a consistent appearance from wall to wall.
- B. Areas Greater than 40 SF:
1. Following preparation steps apply Ashford Formula according to manufacturer's directions.
 2. Apply three medium applications of Retro Guard and allow to cure for 24 hours.
 3. Burnish with propane burnisher and STI Black burnishing pad until Retro Guard no longer increases in gloss.
- C. Areas 40 SF or less:
1. Following preparation steps apply Ashford Formula according to manufacturer's directions.
 2. Apply three medium applications of Retro Guard and allow to cure for 24 hours.

3.2 FIELD QUALITY CONTROL

- A. Field Testing: Engage a qualified walkway auditor to perform field testing to determine if polished concrete floor finish complies with specified coefficient of friction;
1. ANSI B101.1 for static coefficient of friction.
 2. ANSI B101.3 for dynamic coefficient of friction.

END OF SECTION

SECTION 10 00 05 - MISCELLANEOUS SPECIALTIES**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes equipment and specialties not specified in other sections of the Project Manual.
- B. Furnish labor, materials, tools, equipment, services and supervision required to complete Work, including all incidental and complementary Work shown, specified or necessary to complete Work.
- C. Make all final connections for products included in this Section.
- D. Section includes:
 - 1. Outdoor Cabinet Sign for Site Marquee.
 - 2. Dance Barres.
 - 3. Sliding Pass Through Windows at Control Room.
 - 4. Metal Pegboard.

1.2 SUBMITTALS

- A. Shop Drawings: Indicate locations, construction and anchorage details, dimensions and rough-in opening sizes.
- B. Product Data: Submit data for furnishings describing size, color and finish, details of function and attachment methods.
- C. Samples:
 - 1. When directed by the Architect, furnish samples showing full color range and other features of the product.
 - 2. Where applicable, furnish one of each type wall clip or anchoring device to install product to the building construction.
- D. Certify in writing that each product meets the specifications and can be installed in building where scheduled; certifications shall be produced and submitted following verification of site conditions.

1.3 PROJECT CONDITIONS

- A. Verify measurements in field as required for Work fabricated to fit job conditions.
- B. Before ordering items or fabrication of Work, examine Drawings, job conditions, to assure good fit, neat installation.

PART 2 PRODUCTS**2.1 OUTDOOR CABINET SIGN FOR SITE MARQUEE (Base Bid)**

- A. Basis-of-Design: TekStar LED by J. M. Stewart Corporation, or equivalent product of Watchfire Signs LLC.
- B. Characteristics:
 - 1. Cabinet:
 - a. Aluminum construction.
 - b. Reinforced corners to prevent warping and twisting.
 - c. Illuminated with standard length high-output fluorescent lamps with dusk to dawn sensor.

- d. Urethane finish; color to be selected from manufacturer's standard line.
 - e. Size: 6' high x 8' wide.
 - f. Mounting: Dual pole mounted to the low masonry wall and pier indicated on the drawings.
2. Top Header Area
 - a. Text for header area : "GLENRIDGE MIDDLE SCHOOL" with school logo.
- C. Description:
1. Display: Full color, 16mm 60 pixel matrix.
 2. Controller software enabling programmable hold times, centering, calendar scheduling, and presentation styles.

2.2 DANCE BARRES

- A. Basis-of-Design: Metro Double Wall Mount Ballet Barre Brackets;
<https://www.balletbarrestore.com>.
- B. Description:
1. Bracket: Steel 3/16-inch heavy gauge welded construction.
 2. Barre: 1-3/4-inch Poplar sanded.
 3. Finish: Powder; color to be selected by Architect from manufacturer's available colors.
 4. Bracket Spacing: Maximum 48 inches; solid attachment to wall framing.
 5. Provide gasket between bracket and mirror.

2.3 SLIDING PASS THROUGH WINDOWS AT CONTROL ROOM

- A. Basis-of-Design: Arcadia Mark 1 Series (non-thermal) Multi-Sliding Windows (pass through).
- B. Materials:
1. Windows fabricated from aluminum extrusions of 6063-T5 alloy and temper with a minimum wall thickness of 0.090" for the door frame sill member and a minimum of 0.072" for all other members including frame, panel and optional horizontal muntins. The aluminum shall be free of defects which impair strength and appearance.
- C. Construction:
1. Component parts and accessories shall be of aluminum alloy, stainless steel or non-metallic materials which will neither deteriorate nor promote corrosion.
 2. Sill shall have a full-length nylon track cap.
 3. Panel members shall have a minimum of 3/4" glass penetration into the aluminum.
 4. Operable panel shall be equipped with all stainless steel tandem rollers and housings.
 5. Locking device Adams-Rite maximum security lock MS+1850 with stainless steel hook bolt.
 6. Operating panels shall have an extruded aluminum wire pull handle set in either clear finish.
 7. Operating panels shall contain a bottom rail vinyl sweep.
 8. Horizontal members shall have two contact points incorporating silicone treated woven pile with mylar center fins. All vertical members shall have four contact points of silicone treated woven pile with mylar center fins. All shall be held in integral extruded slots and secured to prevent movement or loss while operating sash.
 9. Fixed and/or sliding panels shall be constructed to allow for either factory or field glazing.
 10. Panel glazing shall be accomplished using a "marine" style reusable, wraparound black flexible polyvinyl chloride material per commercial standard CS23060 without the need for separate glazing beads or putty style bedding compounds.
 11. The glazing channel shall be provided with the unit for 1/4" single glazing.
 12. All assembly and installation screws shall be 18-8 or 410 stainless steel.

- D. Finish all exposed areas of aluminum clear anodized Class II (204 R1-0.4-0.7 mils thick) meeting AAA 607.1.
- E. Fabrication:
 - 1. Primary frame must be a minimum of 2" deep per panel required.
 - 2. Frame sections interlock together to form any number of repetitious sections, each capable of accommodating a panel.
 - 3. Each frame corner joint shall be secured with two stainless steel screws.
 - 4. Profile of the fixed jamb and the latching jamb shall include two weather-stripped pockets to receive the fixed and latching stiles.
 - 5. Fixed and sliding panels shall have a nominal 1-1/2" depth and shall have overlapped joints of the mortise type to provide extra strength and interlocking mechanically fastened hairline joints.
 - 6. Interlocks and latching stiles shall be heavy gauge tubular sections assuring precise alignment and to resist twisting under load conditions.

2.4 METAL PEGBOARD

- A. Basis-of-Design: Wall Control Pegboard Organizers; Product Wall Control Industrial Metal Pegboard: www.wallcontrol.com.
- B. Description:
 - 1. Size: 32 inches tall X 16 inches wide.
 - 2. Color: Selected by Architect from manufacturers full range of colors.
 - 3. Metal: 20 guage steel.
 - 4. Pegboard Pattern: Holes and slots.
 - 5. Panel will accept conventional 1/4-inch standard peg-board hooks or wall brackets or slotted pegboard accessories compatible with panel slots.
- C. Accessories:
 - 1. For each pegboard panel provide a set of accessories; Wall Control Standard Workstation Accessory Kit KT-400-WRK (Basis-of-Design)
 - a. (12) Standard Slotted Toolboard Hooks, 3/4" Reach (4) Medium Slotted Toolboard Hooks, 1-7/8" Reach (3) Plastic Bins and Bin Hanger (2) Slotted Toolboard C-Brackets, 1" x 1" (1) Slotted Toolboard C-Brackets, 2" x 2" (1) Slotted Toolboard U-Hooks, 3" Reach (1) Slotted Toolboard Handle Hammer Holder, 1-1/4" (1) Screwdriver Holder Assembly (1) 9" Shelf Assembly with Dividers (1) 6" Shelf Assembly.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Order items in ample time so as not to delay job progress with delivery at job site coordinated with other Work.
- B. Install in a thorough, workmanlike manner, in strict accordance with manufacturer's printed instructions and subject to inspection by the Architect.
- C. Assembly:
 - 1. Deliver factory-built units completely assembled in one piece without joints, whenever possible.
 - 2. Where dimensions exceed unit size, provide two or more pieces of equal length as acceptable to Architect and Owner.
 - 3. When overall dimensions require delivery in separate units, prefit at factory, disassemble for delivery, and make final joints at site.

- 4. Use splines at joints to maintain surface alignment.
 - D. Install units in locations and mounting heights as shown on Drawings, keeping perimeter lines straight, plumb and level.
 - E. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories for complete installation.
 - F. Coordinate job-assembled units with grounds, trim and accessories; join all parts with neat, precision fit.
 - G. Verify accessories required for each unit properly installed and operating units properly functioning.
- 3.2 CLEANUP
- A. Remove temporary protective cover at completion.

END OF SECTION

SECTION 10 11 01 - VISUAL DISPLAY BOARDS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Markerboards and Tackboards.
- B. Porcelain Marker Walls.

1.2 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2009a.
- C. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2012.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.
 - 1. Include dimensions indicating location of boards in relation to other items in the room.
- D. Samples: Submit color charts for selection of color and texture of markerboard, tackboard, tackboard surface covering, and trim.
- E. Test Reports: Show compliance to specified surface burning characteristics requirements.
- F. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For boards having recycled content: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - 2. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
 - b. For composite wood: Documentation indicating compliance with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.
- G. Maintenance Data: Include data on regular cleaning, stain removal .

1.4 QUALITY ASSURANCE

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

1.5 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide life-of-the-building warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

- C. Provide ten year warranty for tackboards to include repair or replacement of tackboards that fail in materials or workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Visual Display Boards:
1. MooreCo, Inc: www.moorecoinc.com.
 2. Claridge Products and Equipment, Inc; Product LCS Markerboard Series 1 (Basis-of-Design): www.claridgeproducts.com.
 3. Marsh Industries, Inc. : www.marsh-ind.com.

2.2 VISUAL DISPLAY BOARDS

- A. Markerboards: Porcelain enamel on steel, laminated to core.
1. Steel Face Sheet Thickness: 24 gage, 0.0239 inch .
 2. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
 3. Backing: Aluminum sheet, laminated to core.
 4. Frame: Extruded aluminum, with concealed fasteners.
 5. Frame Profile: As indicated on drawings
 6. Frame Finish: Anodized, natural.
 7. Accessories: Provide chalk tray and map rail.
 - a. Provide continuous chalk tray; match length of markerboard.
 - b. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.
 8. Modular support system.
- B. Tackboards: Composition cork.
1. Vinyl Plastic Cork:
 - a. Natural materials consisting of linseed oil, granulated cork, resin binders and dry pigments, mixed and calendered onto a natural jute backing.
 - b. Color shall extend throughout total thickness of material.
 - c. Able to self-heal from thumbtack and pin punctures.
 - d. Does not dry, crack, peel or crumble.
 - e. Washable finish.
 2. Cork Thickness: 1/8 inch.
 3. Color: Minimum of nine color selections available for Architect selection; Architect reserves the right to select several colors throughout the Project.
 4. Backing: Fiberboard, 3/8 inch thick, laminated to tack surface.
 5. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 6. Size: As indicated on drawings.
 7. Frame: Same type and finish as for markerboard.
 - a. Exception: Tackboards mounted on doors to be provided with solid wood frame coordinated with species of door.
 8. Frame Finish: Anodized, natural.
- C. Combination Units and Units Made of More Than One Panel: Factory-assembled markerboards and tackboards in a single frame, of materials specified above.
1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.

2. Join panels of similar construction with butt joints, aligned and secured with steel spline concealed in edge of core.
 3. Configuration: As indicated on drawings.
 4. Units Too Large to Ship Assembled: Fully assembled in factory, then disassembled for shipping.
- D. Porcelain Marker Wall:
1. Basis-of-Design: Claridge LCS3 Porcelain Marker Walls.
 2. Location and Sizes: Refer to Drawings.
 3. Narrow 1 1/4" face trim top and bottom in clear satin anodized aluminum finish with over 180 powder coat colors for Architect selection.
 4. Butt panels together for a continuous writing surface; LCS matched butt joints.
 5. Adhesive as recommended by manufacturer.

2.3 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
- B. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
 1. Core for markerboards.
 2. No added urea formaldehyde.
- C. Fiber Board: ASTM C208, cellulosic fiber board.
 1. Core for tackboards.
 2. No added urea formaldehyde.
- D. Aluminum Sheet Backing: 27 gage, 0.014 inch thick.
- E. Adhesives: Type used by manufacturer.
 1. No added urea formaldehyde.

2.4 ACCESSORIES

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 2 inch wide overall, full width of frame.
- B. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail.
 1. Provide two map hooks for every 48 inches of map rail or fraction thereof.
- C. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board.
 1. Provide one standard flag holder at the front of each classroom.
- D. Chalk Tray: Aluminum, manufacturer's standard profile, one piece full length of chalkboard, molded ends, concealed fasteners, same finish as frame.
 1. Do not provide chalk tray at gymnasium location.
- E. Mounting Brackets: To be modular system of slotted aluminum standards permitting height adjustment and interchangeability of units.

2.5 MODULAR SUPPORT SYSTEM FOR VISUAL DISPLAY BOARDS

- A. Standards: 72-inch-long, extruded-aluminum slotted standards designed for supporting visual display boards on panel clips. Standards shall be punched at not less than 4 inches o.c.
 1. Finish: Clear anodic.
- B. Panel Clips: Extruded aluminum or steel with finish to match standards.
- C. Fabricate visual display boards with integral panel clips attached to core material.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Secure units level and plumb.
- C. Butt Joints: Install with tight hairline joints.
- D. All fixed boards to be sealed to walls per authority having jurisdiction.

3.3 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.

END OF SECTION

SECTION 10 11 25 - BULLETIN BOARDS AND DISPLAY CASES**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Non-illuminated bulletin boards; recessed.
 - 2. Illuminated display cases.
 - 3. Poster cases.
- B. Related Sections include the following:
 - 1. Division 6 Section "Interior Architectural Woodwork" for custom cabinets for display cases.
 - 2. Division 10 Section "Visual Display Surfaces" for tackboards.
 - 3. Division 26 Sections for wiring and other electrical work associated with illuminated display cases.

1.2 DEFINITIONS

- A. Bulletin Board and Poster Cases: Tackable surface enclosed in a glazed cabinet.
- B. Display Case: Glazed cabinet with adjustable shelves.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for bulletin boards and display cases.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. Show location of tack assembly seams and joints.
 - 3. Include sections of typical trim members.
 - 4. Wiring Diagrams: Power, signal, and control wiring for illuminated units.
- C. Samples for Initial Selection: For units with factory-applied color finishes as follows:
 - 1. Actual sections of tack assembly.
 - 2. Fabric swatches of vinyl-fabric-faced tack assemblies.
- D. Maintenance Data: For tack assemblies to include in maintenance manuals.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For boards having recycled content: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
 - 2. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
 - b. For composite wood: Documentation indicating compliance with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain each type of product through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of bulletin boards and display cases and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Fire-Test-Response Characteristics: Provide fabrics with the surface-burning characteristics indicated, as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify recessed openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating products without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Give preference to products having recycled content.
- B. Hardboard: AHA A135.4, tempered.
- C. Particleboard: ANSI A208.1, Grade 1-M-1.
- D. Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
- E. Hardwood Plywood: HPVA HP-1, made with adhesive containing no urea formaldehyde.
- F. Cork Sheet: MS MIL-C-15116-C, Type II.
- G. Vinyl Fabric: FS CCC-W-408, Type II, burlap weave; weighing not less than 13 oz./sq. yd.; with flame-spread index of 25 or less when tested according to ASTM E 84.
- H. Extruded-Aluminum Bars and Shapes: ASTM B 221, Alloy 6063.
- I. Clear Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3, with exposed edges seamed before tempering, and 6 mm thick, unless otherwise indicated.
- J. Fasteners: Provide screws, bolts, and other fastening devices made from same material as items being fastened, except provide hot-dip galvanized, stainless-steel, or aluminum fasteners for exterior applications. Provide types, sizes, and lengths to suit installation conditions. Use security fasteners where exposed to view.

2.2 TACK ASSEMBLIES

- A. Vinyl-Fabric-Faced Tack Assembly: 1/4-inch- thick, vinyl-fabric-faced cork sheet factory laminated to 1/4-inch- thick particleboard backing.

2.3 WALL-MOUNTED BULLETIN BOARD AND POSTER CASES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Nonilluminated, Wall-Mounted Bulletin Boards:
 - a. Claridge Products & Equipment, Inc.
 - b. Ghent Manufacturing Inc.
 - c. Marsh Industries, Inc.
 - d. Poblocki & Sons.
 - e. PolyVision Corporation.
- B. General: Factory-fabricated unit consisting of manufacturer's standard cabinet with tack assembly on back inside surface and glazed doors at front.
- C. Aluminum-Framed Cabinet: Extruded aluminum; with clear anodic finish.
- D. Glazed Hinged Doors: 3/16 inch thick, tempered glass set in frame matching cabinet material and finish. Equip each door with full-height continuous hinge and cylinder lock with two keys.
 - 1. Number of Doors: As indicated on Drawings.
- E. Tack Surface: Vinyl-fabric-faced tack assembly.
 - 1. Color: As selected by Architect.
- F. Width: As indicated on Drawings.
- G. Height: As indicated on Drawings.
- H. Depth: As indicated on Drawings.
- I. Mounting Height: As indicated on Drawings.
- J. Mounting: Recessed.

2.4 DISPLAY CASE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AARCO Products, Inc.
 - 2. Claridge Products & Equipment, Inc.
 - 3. Ghent Manufacturing Inc.
 - 4. Poblocki & Sons.
 - 5. PolyVision Corporation.
- B. Recessed, Plywood-Framed Cabinet: Factory-fabricated cabinet, with top, bottom, and sides fabricated from hardwood veneer plywood; with tack assembly on back inside surface, glazed doors at front, and 2-by-2-inch extruded-aluminum angle trim on face to cover edge of recessed opening.
 - 1. Veneer Species: Birch with transparent finish stained to match educational casework plastic laminate.
 - 2. Aluminum Finish: Clear anodic.
- C. Glazed Sliding Doors: 3/16 inch thick tempered glass; unframed; with extruded-aluminum top and bottom track; supported on nylon or ball-bearing rollers; with plastic top guide and rubber bumpers. Equip each door with ground finger pull and adjustable cylinder lock with two keys.
 - 1. Number of Doors: As indicated on Drawings.

- D. Shelves: Minimum 3/16 inch thick tempered glass; supported on adjustable shelf standards and supports.
 - 1. Number of Shelves: 1 shelf for every 12 inches in height or portion thereof, unless indicated otherwise.
- E. Adjustable Shelf Standards and Supports: Manufacturer's standard.
- F. Tack Surface: Vinyl color-impregnated cork tack assembly.
 - 1. Color: As selected by Architect.
- G. Illumination System: Concealed top-lighting system consisting of LED fixtures. Include lamps and internal wiring with single concealed electrical connection to building system. Coordinate electrical characteristics with power supply provided.
 - 1. Lighting to be compatible with 277V.
- H. Width: As indicated on Drawings.
- I. Height: As indicated on Drawings.
- J. Depth: As indicated on Drawings.

2.5 FABRICATION

- A. Fabricate bulletin boards and display cases to requirements indicated for dimensions, design, and thickness and finish of materials.
- B. Use metals and shapes of thickness and reinforcing to produce flat surfaces, free of oil canning, and to impart strength for size, design, and application indicated.
- C. Fabricate cabinets and door frames with reinforced corners, mitered to a hairline fit, with no exposed fasteners.
- D. Fabricate shelf standards plumb and at heights to align shelf brackets for level shelves.

2.6 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- E. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine walls, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

- B. Examine roughing-in for electrical power system to verify actual locations of connections before installation of illuminated units.
- C. Examine walls and partitions for proper backing for bulletin boards and display cases.
- D. Examine walls and partitions for suitable framing depth where recessed units will be installed.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for display cases as required by type and size of unit.

3.3 INSTALLATION

- A. General: Install units in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
 - 1. Mounting Height: As indicated on Drawings.
- B. Bulletin Boards and Poster Cases: Attach units to wall surface with manufacturer's standard concealed hardware; attach aluminum trim over edges of recess cabinets.
- C. Recessed Display Cases: Attach units to wall framing with fasteners at not more than 16 inches o.c. Attach aluminum trim over edges of recessed display cases and conceal grounds and clips. Attach trim with fasteners at not more than 24 inches o.c.
- D. Comply with requirements in Division 16 for connecting illuminated display cases.
 - 1. After installation is complete, install new fluorescent lamps.
- E. Install display case shelving level and straight.

3.4 ADJUSTING AND CLEANING

- A. Adjust doors to operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 10 14 00 - SIGNAGE**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Room and door signs.
- B. Educational signage.
- C. Plaque.
- D. Dimensional characters.

1.2 DESIGN REQUIREMENTS - INTERIOR SIGNS

- A. Permanent Rooms and Spaces:
 - 1. Provide signs identifying each room at each door.
 - 2. Type Styles:
 - a. Must be upper case and sans serif.
 - b. Must have a width to height ratio of between 3:5 and 1:1.
 - c. Must have a stroke width to height ratio of between 1:5 and 1:10.
 - 3. Tactile and Braille Characters: Characters raised a minimum of 1/32 inch and accompanied by Grade 2 braille.
 - 4. Slot for removable room name capable of containing two lines of text.
 - 5. Character Height: Tactile characters must be between 5/8 inch and 2 inches in height.
 - 6. Pictograms (Symbols), if specified:
 - a. Minimum of a 6 inch high field or background; must be supplemented by upper case tactile descriptive verbiage and Grade 2 braille below pictogram.
 - b. No other graphic can invade the pictogram field.
 - c. Pictogram itself is not required to be tactile.
 - d. Provide pictogram and descriptive verbiage accompanied by Grade 2 braille at locations required.
 - 7. Finish and Contrast:
 - a. Matte (non-glare) characters and background; minimum contrast of 70 percent.
 - b. Light characters on dark background or dark characters on light background are acceptable.
 - 8. Mounting Conditions:
 - a. Mount 60 inches from finish floor to baseline of highest tactile letter on latch side of door.
 - b. Where no wall space is provided at the latch side of the door, place on nearest adjacent wall so that a person can approach to within 3 inches of signage without protrusions or swing of door.
- B. Direction and Informational:
 - 1. Type Styles:
 - a. May be upper and lower case and sans serif.
 - b. Shall have a width to height ratio of between 3:5 and 1:1.
 - c. Shall have a stroke width to height ratio of between 1:5 and 1:10.
 - 2. Tactile and Braille Characters: Not required for Type 2 signage.
 - 3. Character Height: Characters shall be sized on viewing distance.
 - 4. Pictograms (Symbols), if specified:
 - a. No tactile requirement.

- b. Provide pictogram at locations designated in Signage Schedule and Drawings.
5. Finish and Contrast:
 - a. Matte (non-glare) characters and background; minimum contrast of 70 percent.
 - b. Light characters on dark background or dark characters on light background are acceptable.
6. Mounting Conditions:
 - a. Mount 60 inches from finish floor to baseline of highest tactile letter on latch side of door.
 - b. Where no wall space is provided at the latch side of the door, place on nearest adjacent wall so that person can approach to within 3 inches of signage without protrusions or swing of door.
- C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, sign types, lettering font, tactile designations, foreground and background colors, locations, overall dimensions of each sign and method of attachment.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 1. When room numbers to appear on signs differ from those on the drawings, include the drawing room number on schedule along with the room number that will appear on the sign.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips of the manufacturers full range of colors.
- F. LEED Submittals: Comply with Section 018113.
 1. EQ Credit 2: Low-Emitting Materials
 2. For interior wet-applied adhesives: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled in name groups.
- C. Store tape adhesive at normal room temperature.

PART 2 PRODUCTS

2.1 SIGNAGE FABRICATION

- A. Available Manufacturers:
 1. Best Sign Systems, Inc.
 2. Mohawk Sign Systems, Inc.
 3. Bayuk Graphic Systems, Inc., Parkesburg, Pennsylvania.
 4. Digital Color Graphics, Pittsburgh, Pennsylvania.
 5. Supersine Company.

B. Fabrication Method:

1. Plaque assembly to be plastic laminate construction; plastic laminate to be impervious to most acids, alkalies, alcohol, solvents, abrasives and boiling water; plastic laminate to be non-static, fire-retardant, and self extinguishing.
2. Approximately 0.080-inch thick non-glare matte acrylic face laminated to approximately 0.080-inch thick acrylic back plate with filler to create windows for inserts, if so indicated.
3. Non-tactile graphics to be subsurface or second surface applied signs; surface-applied graphics are not acceptable.
4. Painted surfaces will not be accepted.
5. Polycarbonate (0.03 inch thick) window inserts, if applicable; painted subsurface to match sign.
6. Tactile Methods:
 - a. Option 1: Tactile Copy Material (where designated): Individual plastic letters or characters of one solid color and chemically bonded by the use of a high strength solvent within a matched routed depression in sign face to create graphics which are raised a minimum of 1/32 inch from the face of sign; tactile characters 5/8 inch to 2 inches in height as required by Architect.
 - b. Option 2: Tactile Copy (where designated): Produced by blasting the laminate assembly removing the background material, and raising the characters and braille; the characters and braille are part of the original outer laminate color and do not require painting.
7. Braille (if applicable): Grade 2 braille engraved into face of sign.
8. Mechanically fasten plaque assembly to wall by use of a backplate, which will be secured to the outer assembly.
9. Corners as indicated; sides can be beveled or flat.
10. Colors to be selected by Architect, which include custom fabrications based on manufacturer's capabilities.

2.2 EDUCATIONAL SIGNAGE

- A. Basis of Design: Apco Arcadia 2000 Series.
- B. Size: 8-1/2"H x 12"L.
- C. Holder and End Caps: ARH11-215H Natural satin anodized aluminum.
- D. Insert:
 1. ClearLens 0.40" PETG non-glare ARI-11-215H-CL with Decorative Wood Vinyl laminated on ClearLens ARI-45-215H-DW; DWC4 Naturals Series finish to be selected from manufacturer's full range.
- E. Backer: Lumicor as selected from Naturals Series.
 1. Size: Refer to drawings.
- F. Mounting: Surface mounted on wall; mechanically-fastened.
- G. Accessories: Suction Cup Removal Tool (SCT).
- H. Locations: Provide 20 signs, locate as directed by Architect.

2.3 DIMENSIONAL CHARACTERS

- A. Available Manufacturers:
 1. A. R. K. Ramos.
 2. Gemini Incorporated.
 3. Matthews International Corporation; Bronze Division..

- B. Aluminum Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.
- C. Cast Characters: Produce characters with smooth flat faces, sharp corners, and precisely formed lines and profiles, free of pits, scale, sand holes, and other defects. Cast lugs into back of characters and tap to receive threaded mounting studs. Alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated. Comply with the following requirements.
 - 1. Character Material: Aluminum.
 - 2. Mounting:
 - a. Typical: Concealed stud; projected 1 inch from wall with aluminum tube spacers.
 - 3. Letter and Number Heights: Provide sizes indicated on Drawings.
 - 4. Font: Helvetica Medium.
 - 5. Color: Match Architect's sample.
 - 6. Finish:
 - a. Typical - Interior and Exterior: Powder coat.
 - 7. Mounting Types: Projected studs and bottom angle bracket mount; refer to Drawings for locations.
 - a. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
 - b. Bottom Angle Bracket Mount: 90° angle bracket measuring 2" x 2" x 1/4" secured to bottom stud locations of letters. Tie-backs to be provided for exterior letters over 8". Letters to be mounted by word.

2.4 PLAQUES

- A. Available Plaque Manufacturers:
 - 1. A. R. K. Ramos.
 - 2. Gemini Incorporated.
 - 3. Matthews International Corporation; Bronze Division.
 - 4. Metal Arts; Div. of L&H Mfg. Co.
 - 5. Nelson-Harkins Industries.
 - 6. Mills Manufacturing Company..
 - 7. Southwell Company (The).
- B. Bronze Castings: ASTM B 584, Alloy UNS No. C86500 (No. 1 manganese bronze).
- C. Cast Plaque: Provide castings free of pits, scale, sand holes, and other defects, as follows:
 - 1. Plaque Material: Bronze.
 - 2. Background Texture: Manufacturer's standard pebble or leatherette texture.
 - 3. Border Style: Projected bevel.
 - 4. Mounting: Concealed studs, noncorroding for substrates encountered.
- D. Cast-Bronze Plaque Finishes: Exposed surfaces free of porosity, burrs, and rough spots; with returns finished with fine-grain air blast.
 - 1. Raised Areas: Hand-tool and buff borders and raised copy to produce manufacturer's standard satin finish.
 - 2. Background Finish: Dark oxidized.
 - 3. Clear Protective Coating: Coat exposed surfaces of copper alloys with manufacturer's standard, clear organic coating specially designed for coating copper-alloy products.
- E. Plaque Schedule: Two plaques.
 - 1. Plaque Size: 18 inches wide by 12 inches high.

2. Text Style: As selected by Architect from manufacturer's standards.
3. Location: As indicated.
4. Plaque for State Funded School Construction Projects: Provide general text indicated on sketch attached at the end of this Section; exact text will be provided by the Owner.
5. County Plaque Layout: Exact text will be provided by the Owner.

2.5 ACCESSORIES

- A. Exposed Screws: Chrome plated; tamper-proof.
- B. Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions after surfaces are finished.
- B. Install neatly, with horizontal edges level, plumb and true, and in correct relation to adjoining Work.
- C. Locate signs where indicated:
 1. If no location is indicated obtain Owner's instructions.
- D. Protect from damage until Substantial Completion; repair or replace damaged items.
- E. Dimensional Characters: Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.
- F. Cast-Metal Plaque: Mount plaque using standard fastening methods to comply with manufacturer's written instructions for type of wall surface indicated.
 1. Concealed Mounting: Mount plaque by inserting threaded studs into tapped lugs on back of plaque. Set in predrilled holes filled with quick-setting cement.

3.3 CLEANING

- A. Wash surfaces following installation.

END OF SECTION

APPENDIX E
SCHOOL PLAQUE

School plaque for State funded school construction projects (12" X 18")

<p>STATE FUNDS FOR THE (select appropriate option) THIS SCHOOL BUILDING WERE PROVIDED THROUGH THE PUBLIC SCHOOL CONSTRUCTION PROGRAM (DATE) <u>BOARD OF PUBLIC WORKS</u> LARRY HOGAN, GOVERNOR PETER FRANCHOT, COMPTROLLER NANCY K. KOPP, TREASURER</p>
--

options to be selected and inserted:

- "... CONSTRUCTION OF ..."
- "... CONSTRUCTION OF AN ADDITION TO ..."
- "... RENOVATION OF ..."
- "... CONSTRUCTION OF AN ADDITION AND RENOVATIONS TO ..."

SECTION 10 21 13.19 - PLASTIC TOILET COMPARTMENTS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Solid plastic toilet compartments.
- B. Urinal screens.

1.2 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- B. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- C. Product Data: Provide data on panel construction, hardware, and accessories.
- D. Samples: Submit two samples of partition panels, 3 x 3 inch in size illustrating panel finish, color, and sheen.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For toilet compartments having recycled content: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
- F. Test Reports: Indicating compliance with NFPA 286.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. ASI.
- B. Scranton Products.
- C. Bradley Corporation.
- D. Hadrian.
- E. Global Partitions.

2.2 COMPONENTS

- A. Toilet Compartments: Solid molded high density polyethylene (HDPE) plastic panels, doors, and pilasters, floor-mounted unbraced.
 - 1. Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
 - 2. Recycled content products are preferred.
 - 3. Color: To be selected from manufacturer's entire range including marble and granite selections.

- B. Door and Panel Dimensions:
 - 1. Thickness: 1 inch.
 - 2. Door Width: 24 inch.
 - 3. Door Width for Handicapped Use: 36 inch, out-swinging.
 - 4. Height: Manufacturer's standard not less than 55 inch.
 - 5. Thickness of Pilasters: 1 inch.
- C. Urinal Screens: Wall mounted with continuous panel brackets and pilaster anchored to floor.
 - 1. Maximum dimension from finished floor to bottom of urinal screen: 12 inches.
 - 2. Minimum dimension from finished floor to top of urinal screen: 60 inches.
 - 3. Minimum depth of urinal screen to be 18 inches; or from finished wall to a minimum of 6 inches beyond the outermost front lip of the urinal, whichever is greater.

2.3 ACCESSORIES

- A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
 - 1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Hollow anodized aluminum tube, 1 x 1-5/8 inch size, with anti-grip strips and cast socket wall brackets.
- C. Pilaster Brackets: Chrome-plated, nonferrous, cast zinc alloy (zamac) or clear anodized aluminum.
- D. Wall Brackets: Continuous type, satin stainless steel or extruded aluminum.
- E. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 - 1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
 - 2. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.
- F. Hardware: Polished stainless steel:
 - 1. Continuous hinges self-closing; stainless steel.
 - 2. Door Latch: Slide type with exterior emergency access feature.
 - a. Accessible stall door to be equipped with a slide latch that does not require gripping or twisting and shall be slotted to permit emergency access
 - 3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 - 4. Coat hook with rubber bumper; one per compartment, mounted on door.
 - 5. Provide door pull for outswinging doors.
 - a. Provide two door pulls (one each side) at accessible compartments to comply with ADA requirements.
- G. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer doors and partitions.
- H. Provide wall stop at out-swinging doors where applicable.

2.4 FABRICATION

- A. Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions.
- B. Make provisions for setting and securing continuous head rail at top of each pilaster.
- C. Provide shoes at pilasters to conceal supports and leveling mechanism.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

3.2 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.3 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.
- D. Adjust latching hardware for proper operation.

END OF SECTION

SECTION 10 21 23 - CUBICLE CURTAINS AND TRACK**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Surface mounted overhead curtain track and guides.
- B. Cubicle curtains.

1.2 REFERENCE STANDARDS

- A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2015.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for curtain fabric characteristics and track system, including carriers.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- D. Samples: Submit 12 by 12 inch sample patch of curtain cloth with representative top, bottom, and edge hem stitch detail, heading with reinforcement and carrier attachment to curtain header.
- E. Samples: Submit 12 inch sample length of curtain track including typical splice and mounting.
- F. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Accept curtain materials on site and inspect for damage.
- B. Store, handle, protect and install absorptive materials, including fabrics materials, in accordance with the Construction IAQ Management Plan required by Division 1 Specifications.
- C. Store curtain materials on site and deliver to Owner for installation when requested.

1.5 EXTRA MATERIALS

- A. See Section 01 60 00 - Product Requirements, for additional provisions.
- B. Provide two of each curtain size.
- C. Provide ten extra carriers.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Cubicle Track and Curtains:
 - 1. A. R. Nelson Co: www.arnelson.com.
 - 2. C/S General Cubicle: www.c-sgroup.com/cubicle-track-curtains.
 - 3. Imperial Fastener Co., Inc: www.imperialfastener.com.
 - 4. Inpro: www.inprocorp.com.

2.2 TRACKS AND TRACK COMPONENTS

- A. Tracks: Extruded aluminum sections; one piece per track run.

1. Structural Performance: Capable of supporting vertical test load of 50 lbs without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.
 2. Track End Stop: To fit track section.
 3. Track Bends: Minimum 18 inch radius; fabricated without deformation of track section or impeding movement of carriers.
 4. Finish on Exposed Surfaces: White enamel.
- B. Curtain Carriers: Nylon rollers, size and type compatible with track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.
- C. Installation Accessories: Types required for specified mounting method and substrate conditions.

2.3 CURTAINS

- A. Cubicle Curtains:
1. Inherently flame resistant or flameproofed; capable of passing NFPA 701 test.
- B. Curtain: Close weave polyester; anti-bacterial, self deodorizing, sanitized, and preshrunk.
- C. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, manufacturer's standard color.
- D. Curtain Fabrication:
1. Width of curtain to be 10 percent wider than track length.
 2. Include open mesh cloth at top minimum 20 inches of curtain for room air circulation.
 3. Curtain Heading: Triple thickness not less than 1 inch and not more than 1-1/2 inches wide, with metal grommet holes for carriers 6 inches on center, double fold bottom hem not less than 1 inch and not more than 1-1/2 inches wide with lead weights included. Lock stitch seams in two rows. Turn seam edges and lock stitch.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and supports above ceiling are ready to receive work of this Section.
- B. Verify that field measurements are as indicated.

3.2 INSTALLATION

- A. Install curtain track to be secure, rigid, and true to ceiling line.
- B. Install end cap and stop device.
- C. Install curtains on carriers ensuring smooth operation.

END OF SECTION

SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Accessories for toilet rooms and utility rooms.
- B. Grab bars.

1.2 REFERENCE STANDARDS

- A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- C. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2011.
- D. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- E. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. LEED Submittals: Comply with Section 018113.
 - 1. EQ Credit 2: Low-Emitting Materials
 - 2. For interior wet-applied adhesives and sealants: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.

1.4 COORDINATION

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS**2.1 MATERIALS**

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Provide 2 keys for each accessory to Owner; master key all lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- F. Adhesive: Two component epoxy type, waterproof.

1. Interior wet-applied adhesives and sealants: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
 - G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
 - H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.
- 2.2 FINISHES
- A. Stainless Steel: Satin finish, unless otherwise noted.
 - B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.
 - C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.
- 2.3 TOILET ROOM ACCESSORIES
- A. The design for each accessory is based on products indicated on the Drawings.
- 2.4 UTILITY ROOM ACCESSORIES
- A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.
 1. Mop/broom holders: Three spring-loaded rubber cam holders at shelf front.
 2. Length: Manufacturer's standard length for number of holders/hooks.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.
- D. Verify that field measurements are as indicated on drawings.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

3.4 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.2 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- C. Product Data: Provide extinguisher operational features.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Amerex Corporation: www.amerex-fire.com.
- B. JL Industries, Inc: www.jlindustries.com.
- C. Larsen's Manufacturing Co: www.larsensmfg.com.
- D. Potter-Roemer: www.potterroemer.com.

2.2 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Dry Chemical Type Fire Extinguishers: Steel tank, with pressure gage.
 - 1. Class Multi-purpose 4-A:60-B:C.
 - 2. Size 10 pounds.
 - 3. Finish: Baked enamel, color as selected.
- C. Wet Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gauge.
 - 1. Class: K type.
 - 2. Size: 2-1/2 gallons.
 - 3. Temperature range: Minus 20 degrees F to 120 degrees F.

2.3 FIRE EXTINGUISHER CABINETS

- A. Fire Rated Cabinet Construction: Two-hour fire rated.
 - 1. Steel; double wall or outer and inner boxes with 5/8 inch thick fire barrier material.
- B. Description: Formed steel box with aluminum trim and door.
 - 1. Fire-Rated Cabinets: Listed and labeled to comply with requirements of ASTM E 814 for fire-resistance rating of walls where they are installed.

- C. Cabinet Configuration: Recessed type.
 - 1. Size to accommodate accessories.
 - 2. Projected Trim: Returned to wall surface, with 1/4 to 5/16 inch projection, and 1-3/4 inch wide face.
 - 3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
- D. Door: Reinforced for flatness and rigidity. Hinge doors for 180 degree opening with continuous piano hinge. Provide roller type catch.
- E. Door Glazing: Float glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
 - 1. Design: Vertical Duo.
- F. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- G. Weld, fill, and grind components smooth.
- H. Finish of Cabinet Exterior Trim and Door: No. 4 - Brushed stainless steel.
- I. Finish of Cabinet Interior: White colored enamel.

2.4 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chrome-plated.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers in cabinets.

END OF SECTION

SECTION 10 50 00 - LOCKERS**PART - GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Student lockers.
 - 2. Staff lockers.
 - 3. Locker benches.
 - 4. Welded Gear Storage lockers.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of locker and bench.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work. Show locker fillers, trim, base, and accessories.
 - 1. Include locker-numbering sequence.
 - 2. Locker combinations must be cross referenced with locker numbers; individual lockers must have a minimum of five series of combinations that can be changed by the Owner as necessary. The cross reference information must be submitted in electronic format for the Owner's use.
- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.
- D. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals specified in Division 1.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - 2. For recycled content steel: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain locker units and accessories through one source from a single manufacturer.
- B. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver lockers until spaces to receive them are clean, dry, and ready for locker installation.
- B. Protect lockers from damage during delivery, handling, storage, and installation.

PART - PRODUCTS**2.1 MANUFACTURERS**

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
 - 1. Republic Storage Systems Co., Inc.
 - 2. List Industries, Inc.; Marquis Protector (Basis-of-Design)

3. Lyon Metal Products, Inc.
4. Penco Products, Inc.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 366/A 366M, matte finish, suitable for exposed applications, and stretcher leveled or roller leveled to stretcher-leveled flatness.
- B. Fasteners: Zinc- or nickel-plated steel, slotless-type exposed bolt heads, and self-locking nuts or lock washers for nuts on moving parts.
- C. Recycled Content: Provide steel with minimum 25 percent post-consumer recycled content.

2.3 STUDENT AND STAFF LOCKERS

- A. Sizes: Refer to Locker Schedule on Drawings.
- B. Body: Form backs, tops, bottoms, sides, and intermediate partitions from steel sheet; flanged for double thickness at back vertical corners. Comply with the following:
 1. Back and Side Material Sheet Thickness: 24 gage.
 2. Top and Bottom Material Sheet Thickness: 20 gage.
 3. Exposed Ends: Form exposed ends of nonrecessed lockers from minimum 16 gage thick steel sheet.
- C. Frames: Form channel frames from minimum 16 gage thick steel sheet; lapped and welded at corners. Form continuous integral door strike on vertical frame members. Provide resilient bumpers to cushion door closing.
 1. Cross Frames: Form intermediate channel cross frames between tiers from minimum 16 gage thick steel sheet. Weld to vertical frame members.
 2. Latching shall be achieved by securing an 11 gage frame hook to the locker side frame located midway up on the door.
- D. Doors:
 1. One-piece steel sheet, formed into double return flanges at vertical edges and flanged at right angles at top and bottom edges. Fabricate to prevent springing when opening or closing, and to swing 180 degrees.
 2. Comply with the following:
 - a. Sheet Thickness: 14 gage minimum.
 - b. Doors on tiered lockers shall be reinforced with a full height 16 gage channel reinforcement.
 - c. Concealed Vents - Typical: Provide slotted perforations in top and bottom horizontal return flanges of doors; doors to be flush design without louvers or perforations.
 - d. Vents - Locker Rooms: Provide manufacturer's diamond-shaped perforations; louvers are not acceptable.
- E. Shelves: Provide hat shelf in single-tier units; fabricated from minimum 24 gage thick, formed steel sheet; flanged on all edges.
- F. Hinges: Steel, full loop, five or seven knuckle; tight pin; minimum 2 inches high. Weld to inside of door frame and attach to door with at least two factory-installed fasteners that are completely concealed and tamper resistant when door is closed. Provide at least three hinges for each door more than 36 inches high and at least two hinges for each door 36 inches high or less.
- G. Recessed Handle and Latch: Manufacturer's standard housing, formed from 20 gage stainless steel, with integral door pull, recessed for locking devices as follows:
 1. At Staff Lockers: Provide single-point safety latch system with built-in dead bolt combination lock.

2. At Student Lockers: Frame hook shall have a padlock hasp protruding through the stainless steel recessed pocket. Padlocks to be supplied by Owner.
3. Doors shall have a catch to retain unlocked doors in the closed position and are to be self latching upon closing.

2.4 ADA COMPLIANT LOCKERS

- A. Provide handicapped accessible lockers, complying with the following:
 1. Forward Reach Requirement: Provide single tier lockers with a hat/hook shelf and coat hooks located not more than 48 inches above finished floor. Provide one additional shelf near the bottom of the locker so that it is not lower than 15 inches above finished floor.
 2. Place ADA compliant lockers at least 24 inches away from any wall or other obstacle and provide a minimum clear floor space of 30 by 48 inches with 10-inch minimum for door swing. Provide an area in front of locker within 60-inch-diameter turning circle to allow unobstructed access.
 3. Signage: Apply a decal with the international symbol of accessibility to the face of ADA compliant locker doors.
- B. Quantity: Minimum 5 percent of each locker type, but no less than one of each type.

2.5 WELDED GEAR STORAGE LOCKERS

- A. Basis-of-Design: Patriot Gear Lockers by Penco Products; Gear Locker by Republic; Gear Lockers by Salsbury Industries, or equal product of other named manufacturers.
- B. All-welded construction.
- C. Locker Body: Sides, Bottoms, Tops, and Shelves: 16 gauge steel. Sides punched for shelf locations on nominal 12 inch centers.
- D. Backs: Solid 18 gauge steel.
- E. Groups to 48 inches wide: One piece back.
- F. Groups over 48 inches wide: Two piece back.
- G. Frame: Minimum 16 gauge formed in a channel shape with hemmed edge.
- H. Sides: Minimum 16 gauge sheet steel with 3/4 inch wide by 1-1/2 inch high diamond-shaped perforations. Optional: solid sides without ventilation. Tops: Notched and formed sheet; one continuous flat top for each group of lockers.
- I. Channel Base: Notched and formed sheet; one continuous bottom for each group of lockers, suitable for anchoring to wood or concrete bases. Adds 4 inches to the overall height of locker. Shelves: Flanged four sides with additional return flange on front edge to increase strength.
- J. Interior Equipment:
 1. Shelf: Minimum 16 gauge full width, located approximately 12 inches below top of locker.
 2. Hooks and Coat Rod: Two heavy duty 3" high, 7/8" wide 2-1/2 inch deep single-prong wall hooks and one heavy duty chrome plated 1 inch diameter coat rod.
- K. Doors: One piece 14 gauge sheet steel. Standard ventilation: 6 inch wide by 3/4 inch high horizontal louvers arranged in two groups of six.
- L. Hinges: Continuous type: Minimum 16 gauge piano hinge measuring full height of door. Welded to door and attached to locker frame using steel rivets.
- M. Single Point Latch: 24 inch wide single door only. Recessed handle with integral pull and minimum 11 gauge steel hasp welded to locker frame.

2.6 FINISHES, GENERAL

- A. Finish all steel surfaces and accessories, except prefinished stainless-steel and chrome-plated surfaces.
- B. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond. Use manufacturer's standard methods.
- B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-enamel finish consisting of a thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 1.4 mils on doors and frames, and 1.1 mils elsewhere.
- C. Locker Colors: As selected from manufacturer's standard color range. A maximum of 5 colors will be selected.

2.8 LOCKER BENCHES

- A. Tops: Clear hardwood tops 9-1/2 inches wide by 1-1/4 inches thick.
- B. Supports: Steel pipe standards spaced not more than 6 feet on center.
- C. Overall Height: 17-3/4 inches.
- D. Finish:
 - 1. Wood: Three coats of polyurethane.
 - 2. Steel: Primer and two coats of enamel; color to match lockers.
- E. Attach each standard to top by screws and anchor to floor by two suitable anchors.

2.9 ADA-COMPLIANT LOCKER BENCHES

- A. Provide ADA-compliant design with back; anchored powder coated aluminum square tubing bench base and back brackets; four pedestals required.
 - 1. Spacing: A minimum of 30 inches clear space is required for parallel approach to a short end of a bench seat.
 - 2. Seat size: Benches must be 20-24 inches deep and a minimum of 42 inches long; refer to Drawings.
 - 3. Back support: Minimum of 42 inches long and begin no more than 2 inches above the seat, extending to at least 18 inches above the seat.
 - 4. Seat height: Bench seat must be 17-19 inches above the floor; refer to Drawings.
 - 5. Bench Tops and Back Panels: Solid maple matching standard benches.

PART - EXECUTION**3.1 INSTALLATION**

- A. Install metal lockers and accessories level, plumb, rigid, and flush according to manufacturer's written instructions. Anchor framing consist of 3 horizontal rows of continuous 2 x 4 wood framing behind lockers. Secure to wall with construction adhesive and cut nails.
- B. Anchor lockers to built up bases and walls at intervals recommended by manufacturer, but not more than 36 inches o.c. Install anchors through backup reinforcing plates where necessary to avoid metal distortion, using concealed fasteners. Install lockers in accordance with details indicated on Drawings.
- C. Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates. Attach recess trim to recessed lockers with concealed clips.
- D. Attach boxed end panels with concealed fasteners to conceal exposed ends of nonrecessed lockers.
- E. Seal lockers to wall in accordance with local authority having jurisdiction.

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 to factory-finished appearance, 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 10 56 13 - METAL STORAGE SHELVING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Four post shelving.
- B. Shelving accessories.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Rated uniform shelf loads.
 - 2. Details of shelving assemblies, including reinforcement.
 - 3. Accessories.
- C. Test Reports: Provide independent agency test reports documenting compliance with specified structural requirements.
 - 1. In lieu of test reports, detailed drawings stamped and sealed by a Professional Engineer licensed in the State of Maryland will be acceptable.
- D. Shop Drawings: Indicate location, type, and layout of shelving, including lengths, heights, and aisle layout, and relationship to adjacent construction.
 - 1. Indicate methods of achieving specified anchoring requirements.
- E. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and finishes.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Inspect for dents, scratches, or other damage. Replace damaged units.
- B. Store in manufacturer's unopened packaging until ready for installation.
- C. Store under cover and elevated above grade.

1.4 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide one year manufacturer warranty covering defects of manufacturing and workmanship and rust and corrosion.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Four Post Shelving:
 - 1. Hallowell, Div. of List Industries, Inc : www.hallowell-list.com.
 - 2. Penco Products, Inc : www.pencoproducts.com.
 - 3. SpaceSaver Corporation: www.spacesaver.com. (Basis-of-Design)
 - 4. Lyon Metal Products, Inc.
 - 5. Republic.

2.2 SHELVING - GENERAL

- A. See drawings for layout and sizes.
- B. Fabricate all units as initial shelving units with a post at each corner so that units may be moved or relocated by Owner as desired
- C. Shelving: Provide products tested to comply with ANSI MH28.1 for design criteria, lateral stability, shelf connections, and shelf capacity.
- D. Anchors: Provide anchoring hardware to secure each shelving unit to wall.
 - 1. Provide hardware of type recommended by manufacturer for substrate.

2.3 FOUR POST SHELVING

- A. Design: Wedge-lock type consisting of uprights, shelves, and shelf supports, designed to be assembled without fasteners or clips. Shelves shall not have any holes on exposed surfaces. Front and back flanges shall be flush with outside faces of posts. Design shall permit individual shelf adjustment and/or removal anywhere along the entire height of uprights.
 - 1. Materials and Workmanship: Fabricate units from Class 1, cold-rolled steel sheet with all bends sharp and true and no exposed “knife” edges.
 - 2. All units shall be free of burrs, sharp edges and projecting hardware with smooth, non-abrasive surfaces and edges.
 - 3. After fabrication, shelving shall exhibit no dents, “oil canning”, buckling or other surface irregularities.
- B. Uprights: Formed from steel sheet to a hollow “tee” shape for intermediate supports and formed angles for end supports. Uprights shall have keyhole slots on inner wall only. Provide with sheet steel panels full height and depth of end uprights. Provide intermediate “tee” uprights between adjacent units.
- C. Shelves: Form from sheet steel with flanges on all sides and return hem on front and back flanges. Ends shall be formed to clear inside of upright offset panels. Shelves shall be independently adjustable. Provide all shelves with slots for file dividers.
- D. Canopy Tops: Same construction as shelf units.
- E. Shelf Supports: Form from heavy gauge steel sheet with four solid steel shoulder rivets, two per ear, that interlock with inner wall of uprights.
- F. Nominal Shelf Dimensions: Refer to Drawings.
 - 1. Shelf Edge Vertical Profile: 3/4 inch maximum.
 - 2. Vertical Adjustment Increment: 1-1/2 inches.
 - 3. Width Of Intermediate Uprights: 2 inches.
 - 4. Clearance Between Uprights: Nominal shelf section width minus 2 inches.
 - 5. Levelness of Completed Shelf Units: Maximum 1/8” between bottom shelf and canopy top, measured along the edge of any upright in any direction.
 - 6. Number of Vertical Shelf Spaces: as per written description and elevation dwg.
 - 7. Vertical Shelf-To-Shelf Spacing: as per written description and elevation dwg.
- G. Load Carrying Capabilities: Provide shelf units capable of supporting 40 pounds per lineal foot with maximum deflection of L/140. Shelves shall exhibit no permanent deflection under fully loaded conditions.
- H. Powder Coat Paint Finish. Color to be selected from manufacturer’s standard finishes.
- I. Tops to be manufactured of minimum 22 gauge powder coated steel to match shelving color.
- J. Provide overlap of sheet metal material (6” min) at seams.
- K. All seams to be caulked with GE RTV 102 caulking material or equal.

- L. All tops to be provided with a 2" bend of 22 gauge sheet metal that extends beyond the face of the adjacent shelving unit to prevent water from flowing down into the gap between shelving ranges. When installing protective tops on HD systems, a matching piece of sheet metal with a 2" flange to be installed on adjacent shelving units so that they mate when movable shelving units are compacted together to eliminate loss of aisle opening space.
- M. All seams to be visually inspected during installation and after completion to verify that the caulk has properly sealed all joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate is level and that clearances are as specified.
- B. Verify that walls are suitable for shelving attachment.
- C. Do not begin installation until substrates have been properly prepared.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor and reinforce as specified, as indicated on drawings, and as recommended by manufacturer.
- C. Install shelving with shelf surfaces level and vertical supports plumb; adjust feet and bases as required.
- D. Out-Of-Square Tolerance - Four Post Shelving: Maximum of 1/8 inch difference in distance between bottom shelf and canopy top, measured along any post in any direction.

3.3 PROTECTION

- A. Clean area after installation.
- B. Protect installed products until completion of project.
- C. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 10 73 10 - PROTECTIVE COVERS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Engineering design, fabrication and installation of complete welded, extruded aluminum canopies.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants.

1.3 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- B. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- C. AWS D1.2 - Structural Welding Code - Aluminum.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product information, specifications and installation instructions for building components and accessories.
- C. Shop Drawings: Submit detailed drawings, all mechanical joint locations with complete details, connections, jointing and accessories.
- D. Certification: Submit design calculations signed by a Registered Professional Engineer, licensed in the State of Maryland. Design calculations shall state that the protective cover system design complies with the wind requirements of ASCE 7, the stability criteria of applicable building code, and all other governing criteria.
- E. Samples for Initial Selection: For each colored or finished component of each type of protective cover indicated.
 - 1. Include similar Samples of accessories involving color selection.
- F. Welding certificates.
- G. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content steel: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
- H. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Protective cover shall be wholly produced by a recognized manufacturer with at least five years experience in the design and fabrication of extruded aluminum protective cover systems. Components shall be assembled in shop to greatest extent possible to minimize field assembly. Protective cover shall be installed by manufacturer. Third party installation is not acceptable.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2, "Structural Welding Code - Aluminum."

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of awnings in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Where awning installation is indicated to fit to other work, verify dimensions of other work by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for fenestration operation throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and fabricator agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: 5 years from date of Substantial Completion.
- B. 20-year warranty on finish including checking, crazing, peeling, chalking, fading and/or adhesion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Mapes Industries, Inc.; Super Lumideck Hanger Rod Canopy.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering covers that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Architectural Fabrication, Inc.
 - 2. MASA Architectural Canopies.
 - 3. Perfection Architectural Covers, Inc.

2.2 MATERIALS

- A. Aluminum Members: All sections shall be extruded aluminum 6063 alloy, heat treated to T-6 temper.
- B. Fasteners: Fasteners shall be aluminum, 18-8 stainless steel or 300 series stainless steel.
- C. Gaskets: Gaskets shall be dry seal santoprene pressure type.
- D. Sealants: Single component silicone, in color to match sheets and extrusions; refer to Section 07 92 00 - Joint Sealants.
- E. Recycled Content: Provide steel with at least 25 percent post-consumer recycled content.

2.3 COMPONENTS

- A. Beams: Beams shall be open-top tubular extrusion of size and shape shown on drawings, top edges thickened for strength and designed to receive deck members in self-flashing manner. Structural ties shall be installed in tops of all beams.
- B. Deck: Deck shall be extruded self-flashing sections interlocking into a composite unit. Closures at deck ends shall be welded plates.

- C. Hanger Rods: Galvanized/zinc plated; minimum 3/4 inch diameter pipe with attachment hardware.
- D. Fascia:
 - 1. Fascia shall be extruded aluminum; manufacturer's custom 12 inch shape.
 - 2. Provide on all sides of protective cover, including side against exterior wall construction.
- E. Flashing: Flashing shall be 0.040 aluminum (min.). All thru-wall flashing by others.
- F. Accessories: Flashings, brackets and other items necessary for a complete installation.
 - 1. Connect to adjacent downspouts draining into storm drain system, as available to location; perforated drainage at other locations.

2.4 FABRICATION

- A. Bent Construction: Beams shall be factory welded with neatly mitered corners into one-piece rigid bents. All welds shall be smooth and uniform using an inert gas shielded arc. Suitable edge preparation shall be performed to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Rigid mechanical joints shall be used when shipping limitations prohibit the shipment of fully welded bents.
- B. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at 8" O.C. creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Deck shall be assembled with sufficient camber to offset dead load deflection.
- C. Concealed Drainage: Water shall drain from covered surfaces into integral fascia gutter and directed to indicated discharge.
- D. Form exposed field connections with hairline joints, flush and smooth, using concealed fasteners where possible.

2.5 FINISHES

- A. Fluoropolymer Finish: AAMA 605.2, two coat; color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight.
 - 1. Custom color match to metal wall panel selection.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for supporting members, inserts, installation tolerances, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Erection:
 - 1. Installation to be in strict accordance with manufacturer's shop drawings.
 - 2. Protect the finish of components during handling and erection.
 - 3. Protective cover shall be erected true to line, level and plumb.
- B. Protective cover components shall be cleaned promptly after installation.

- C. Extreme care shall be taken to protect materials during and after installation.

END OF SECTION

SECTION 10 75 00 - FLAGPOLES**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes a ground-set flagpole made from aluminum.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide flagpole assemblies, including anchorages and supports, capable of withstanding the effects of wind loads, determined according to NAAMM FP 1001, "Guide Specifications for Design of Metal Flagpoles" unless governing jurisdiction provides other requirements.
 - 1. Base flagpole design on nylon or cotton flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.
 - 2. Basic Wind Speed: 100 mph; 3-second gust speed at 33 feet aboveground.

1.3 SUBMITTALS

- A. Product Data: For type of flagpole required.
- B. Shop Drawings: Include elevations and details showing general arrangement, jointing, fittings and accessories, grounding, and anchoring and supporting systems.
 - 1. Include details of foundation system for ground-set flagpole.
- C. Structural Calculations: Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Qualification Data: For professional engineer.

1.4 QUALITY ASSURANCE

- A. Source Limitations:
 - 1. Obtain flagpole as a complete unit, including fittings, accessories, bases, and anchorage devices, from a single manufacturer.
 - 2. Obtain flagpole through one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Spiral wrap flagpole with heavy paper and enclose in a hard fiber tube or other protective container.

1.6 COORDINATION

- A. Provide anchoring devices to precast concrete manufacturer for casting.

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:
 - 1. American Flagpole; a Kearney-National Inc. Company.
 - 2. Baartol Company Inc. (The)
 - 3. Concord Industries, Inc.
 - 4. Ewing International.
 - 5. Lingo Inc.; Acme Flagpole Division.
 - 6. Michigan Flagpole Inc.

7. Morgan-Francis Div.; Original Tractor Cab Co., Inc.
8. Pole-Tech Company Inc.

2.2 FLAGPOLE

- A. Flagpole Construction, General: Construct flagpole in one piece if possible. If more than one piece is necessary, comply with the following:
 1. Fabricate shop and field joints without using fasteners, screw collars, or lead calking.
 2. For tapered flagpoles, provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.
- B. Exposed Height: 30 feet.
- C. Aluminum Flagpole:
 1. Provide cone-tapered flagpole fabricated from seamless extruded tubing complying with ASTM B 241, Alloy 6063, with a minimum wall thickness of 3/16 inch.
 2. Heat treat after fabrication to comply with ASTM B 597, Temper T6.
- D. Foundation Tube: Galvanized corrugated-steel foundation tube, 0.064-inch minimum nominal wall thickness. Provide with 3/16-inch steel bottom plate and support plate; 3/4-inch diameter, steel ground spike; and steel centering wedges all welded together. Galvanize steel parts, including foundation tube, after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole.
 1. Provide flashing collar of same material and finish as flagpole.
 2. Provide steel ground protectors extending 12 inches aboveground and 6 inches belowground for steel flagpoles where flashing collars are not provided.

2.3 FITTINGS

- A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.
 1. 0.063-inch spun aluminum, finished to match flagpole.
- B. Internal Halyard, Cam Cleat System: 5/16-inch- diameter, braided polypropylene halyard; cam cleat; and concealed revolving truck assembly with plastic-coated counterweight and sling. Provide flush access door secured with cylinder lock. Finish truck assembly to match flagpole.
 1. Halyard Flag Snaps: Provide two chromium-plated bronze swivel snap hooks per halyard.
 2. Provide with neoprene or vinyl covers.

2.4 MISCELLANEOUS MATERIALS

- A. Concrete: Comply with requirements in Division 3 Section "Building Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi.
- B. Sand: ASTM C 33, fine aggregate.
- C. Elastomeric Joint Sealant: Multicomponent urethane joint sealant complying with requirements in Division 7 Section "Joint Sealers" for Use NT (nontraffic) and for Use M, G, A, and, as applicable to joint substrates indicated, O joint substrates.

2.5 FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
 1. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 EXECUTION

3.1 PREPARATION

- A. Prepare uncoated metal flagpole that is set in a foundation tube by painting below-grade portions with a heavy coat of bituminous paint.
- B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete.
- C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms and foundation tube, sleeve, or anchor bolts in position, to prevent displacement during concreting.
- D. Place concrete immediately after mixing. Compact concrete in place by using vibrators. Moist-cure exposed concrete for not less than seven days or use nonstaining curing compound.
- E. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

- A. General: Install flagpole where shown and according to Shop Drawings and manufacturer's written instructions.
- B. Foundation-Tube Installation: Install flagpole in foundation tube, seated on bottom plate between steel centering wedges. Plumb flagpole and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION

SECTION 11 00 05 - MISCELLANEOUS EQUIPMENT**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes equipment not specified in other sections of the Project Manual.
- B. Furnish labor, materials, tools, equipment, services and supervision required to complete Work, including all incidental and complementary Work shown, specified or necessary to complete Work.
- C. Make all final connections for products included in this Section.
- D. Section includes:
 - 1. Kiln.
 - 2. Kiln Ventilator.
 - 3. Ice Machine.
 - 4. Changing Table.
 - 5. Miscellaneous Room Equipment and Furnishings.

1.2 SUBMITTALS

- A. Shop Drawings: Indicate locations, construction and anchorage details, dimensions and rough-in opening sizes.
- B. Product Data: Submit data for furnishings describing size, color and finish, details of function and attachment methods.
- C. Samples:
 - 1. When directed by the Architect, furnish samples showing full color range and other features of the product.
 - 2. Where applicable, furnish one of each type wall clip or anchoring device to install product to the building construction.
- D. Certify in writing that each product meets the specifications and can be installed in building where scheduled; certifications shall be produced and submitted following verification of site conditions.
- E. LEED Submittals: Comply with Section 018113.
 - 1. Water Efficiency Prerequisite 2: Indoor Water Use Reduction
 - a. Ice machine: ENERGY STAR and documentation demonstrating air-cooled or closed-loop cooling system.
- F. Submit operation and maintenance data for electrically operated equipment.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five years experience.

1.4 PROJECT CONDITIONS

- A. Verify measurements in field as required for Work fabricated to fit job conditions.
- B. Before ordering items or fabrication of Work, examine Drawings, job conditions, to assure good fit, neat installation.

PART 2 PRODUCTS

2.1 KILN

- A. Project Standard: Skutt Ceramic Products, Inc. (503)231-7726.
- B. Selection: Model: KM1227-3PK.
- C. Description: 28 inches diameter, 27 inches deep, 9.92 cubic feet, 410 pounds, temperature limit Cone 10 (2350 degrees).
 - 1. Provide "KilnMaster" Model KM-1227PK, 3 Phase, 208 Volts, 46.7 Amps, 14300 Watts, 6 gauge copper wire, 60 amp breaker, NEMA (refer also to the electrical drawings and specifications).
- D. Provide the #1227 Furniture Kit System (Large Tri-Post Assortment Kit and 8 - 1" half shelves).

2.2 KILN VENTILATOR

- A. Project Standard: Skutt Ceramic Products, Inc. (503)231-7726.
- B. Selection: Model: Enviro Vent 2.
- C. The ventilation system motor shall be 120 Volt, 1.4 Amps. Blower shall have static pressure and CFM capacities to suit project conditions.
- D. Provide ventilation system with vent piping, to connect to vent piping as indicated on mechanical drawings.
- E. Coordinate provision of disconnect switch and wiring by the electrical subcontractor, and hook up of ducting by the mechanical subcontractor.
 - 1. Provide kiln and ventilator with Skutt "EnviroLink".

2.3 ICE MACHINE

- A. Project Standard: Summit Appliance Division, Felix Storch, Inc.; Model BIM44GADA.
- B. Selection: Under counter compact cuber with storage.
 - 1. Size: 14-1/2 inches wide x 23-1/2 inches deep x 32-3/8 inches high.
 - 2. Capacity: Stores 25 lbs. of ice.
 - 3. Produces up to 50 lbs of ice in 24 hours.
- C. Provide external ice scoop and holder.
- D. ENERGY STAR labeled.

2.4 CHANGING TABLE

- A. Acceptable Products:
 - 1. Armedica; Hi-Lo AM-SX 1060 Child Size with safety belt; Imperial Blue.
 - 2. Harbor Medical; Mona.

2.5 MISCELLANEOUS ROOM EQUIPMENT AND FURNISHINGS

- A. Design is based on products scheduled on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Order items in ample time so as not to delay job progress with delivery at job site coordinated with other Work.

- B. Install in a thorough, workmanlike manner, in strict accordance with manufacturer's printed instructions and subject to inspection by the Architect.
 - C. Assembly:
 - 1. Deliver factory-built units completely assembled in one piece without joints, whenever possible.
 - 2. Where dimensions exceed unit size, provide two or more pieces of equal length as acceptable to Architect and Owner.
 - 3. When overall dimensions require delivery in separate units, prefit at factory, disassemble for delivery, and make final joints at site.
 - 4. Use splines at joints to maintain surface alignment.
 - D. Install units in locations and mounting heights as shown on Drawings, keeping perimeter lines straight, plumb and level.
 - E. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories for complete installation.
 - F. Coordinate job-assembled units with grounds, trim and accessories; join all parts with neat, precision fit.
 - G. Verify accessories required for each unit properly installed and operating units properly functioning.
- 3.2 CLEANUP
- A. Remove temporary protective cover at completion.

END OF SECTION

SECTION 11 30 13 - APPLIANCES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Appliances.

1.2 REFERENCE STANDARDS

- A. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.
- C. LEED Submittals: Comply with Section 018113.
 - 1. WE Prerequisite 2: Indoor Water Use Reduction
 - a. Residential clothes washers: Product data indicating compliance with ENERGY STAR
 - b. Residential dishwashers (standard and compact): Product data indicating compliance with ENERGY STAR.
- D. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

1.5 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.
- C. Provide ten (10) year manufacturer warranty on magnetron tube of microwave ovens.
- D. Provide ten (10) year manufacturer warranty on tub and door liner of dishwashers.

PART 2 PRODUCTS**2.1 APPLIANCES**

- A. The design for each appliance is based on products indicated on the Drawings.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Verify utility rough-ins are provided and correctly located.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor built-in equipment in place.

3.3 ADJUSTING

- A. Adjust equipment to provide efficient operation.

3.4 CLEANING

- A. Remove packing materials from equipment and properly discard.
- B. Wash and clean equipment.

END OF SECTION

SECTION 11 40 00 – FOODSERVICE EQUIPMENT**PART 1 GENERAL****1.1 DESCRIPTION**

- A. Scope: Furnish all labor, materials, services, equipment and appliances required to provide and deliver all foodservice equipment hereinafter specified into the building, uncrate, assemble, hang, set-in-place, level, and completely install, exclusive of final utility connections.
- B. Related Work Specified Elsewhere:
 - 1. Coordinate all plumbing, electrical and ventilating work required in conjunction with commercial foodservice equipment including rough-in to points indicated on mechanical drawings, and final connections from rough-in points, electrical service to points of connection and final connections.
 - 2. Refrigeration work will be done by the Kitchen Equipment Contractor. Coordinate electrical and plumbing connections with Divisions 22 and 26.
 - 3. Coordinate with Division 22 all traps, steam traps, grease traps, line strainers, tail pieces, valves, mixing valves, backflow preventors, stops, shut-offs, and fittings necessary for equipment specified.
 - 4. Coordinate all line and disconnect switches, safety cut-offs and fittings, convenience boxes or other electrical controls, fittings and connections with Division 26. Starting switches for certain specified pieces of foodservice equipment are to be provided by Kitchen Equipment Contractor.
 - 5. Coordinate any sleeves or conduit required for refrigeration, syrup tubing, or carbonation tubing with Division 22.
 - 6. Coordinate with Division 22 ventilating fans and all duct work between same and ceiling rough-in openings, and from same to discharge opening in building.

1.2 DEFINITIONS

- A. All references to the terms "Contractor", "Kitchen Equipment Contractor", or "K.E.C." in the specifications and/or on the drawings shall be defined to mean the Kitchen Equipment Contractor.
- B. All references to the term "Owner" in the specifications and/or on the drawings shall be defined to mean the Owner or Owner's designated representative and the Foodservice Equipment Consultant.
- C. All references to the term "Consultant" or "Foodservice Equipment Consultant" in the specifications and/or on the drawings shall be defined to mean **NYIKOS ASSOCIATES, INC.** its employees, and authorized representatives and is referred to throughout the contract documents as if singular in number and masculine in gender.
- D. The phrase "The K.E.C. shall" or "by the K.E.C.", as applicable, is understood to be included as a part of each sentence, paragraph or article of these specifications unless otherwise indicated or specified.

1.3 QUALITY ASSURANCE

- A. Qualification of Suppliers:
 - 1. Commercial foodservice equipment suppliers shall submit satisfactory evidence of compliance with the following qualifications and conditions to be approved.
 - a. Successful completion of jobs of comparable scope.
 - b. Have manufacturer's authorization to distribute and install specified factory items of equipment.
 - c. Maintain a permanent staff experienced in the installation of foodservice equipment and

- preparation of professional style rough-in drawings and brochures.
- d. Maintain or have access to fabrication shop meeting N.S.F. requirements. If other than foodservice equipment suppliers own fabrication shop, obtain Consultant approval of fabrication shop desired to be used.
 - e. Maintain or have access to a readily available stock of repair and replacement parts, together with authorized service personnel.
- B. Qualification of Fabricators:
1. Fabricators shall be an N.S.F. approved organization with trained personnel and facilities to properly design, detail and fabricate equipment in accordance with the specifications and standard details contained herein.
 2. Custom fabricated equipment shall bear the National Sanitation Foundation seal of approval and listed as such under N.S.F. Standards No. 2 and No. 33.
 3. Only one (1) fabricator shall be used for this project, and all equipment will be fabricated at the same shop. Where units cannot be fully shop-fabricated, complete fabrication at project site.
 4. Acceptable fabricators are:
 - a. Pro Stainless, Inc., Keyser, WV
 - b. Commercial Stainless, Inc., Bloomsburg, PA
 - c. Keystone Custom Fabricators, Inc.; Elizabeth, PA.
 - d. Southern Equipment Fabricators, Inc.; Columbia, SC
 - e. Custom Metals of Virginia, Inc.; Manassas, VA
 - f. Other fabricators, as approved by Consultant.
- C. Qualification of Manufacturers:
1. Manufacturers shall be regularly engaged in the production of items furnished and shall have demonstrated the capability to furnish similar equipment that performs the functions specified or indicated herein.
- D. Standard Products:
1. Materials, products, and equipment furnished under this contract shall be the standard items of manufacturers regularly engaged in the production of such materials, products, and equipment and shall be of the manufacturer's latest design that complies with the specifications which have been produced and used successfully on other projects and in similar applications.
 2. Discrepancies within contract documents should immediately be brought to the attention of the Consultant in writing for clarification prior to fabrication or ordering of standard items.

1.4 PLANS & SPECIFICATIONS

- A. Specifications and drawings have been prepared to form the basis for procurement, erection, start-up and adjustment of all equipment in this contract. Plans and specifications shall be considered as mutually explanatory and work required by one, but not the other, shall be performed as though required by both. Items required by one, but not by the other shall be provided as though required by both. Work shall be accomplished as called for in specifications and shown on drawings, so that all items of equipment shall be completely functional for purpose for which they were designed. When there is any discrepancy between drawings and specifications, drawings shall govern. Bidders should seek clarification of any discrepancies from the Consultant prior to bidding.

1.5 SUBMITTALS

- A. General Requirements:
1. Within six (6) weeks or earlier, as required, assemble and submit all shop drawings, rough-in drawings, brochures, color samples, etc. as a complete package. There will be no review

- of partial submittals.
2. Any and all costs, to all trades and parties involved, arising from delay of project due to non-submittal of the complete package by the K.E.C. within a reasonable time period shall be borne solely by the K.E.C.
 3. Identify each submittal by project name, date, contractor, submittal name, and any other necessary information to distinguish it from other submittals.
- B. Shop Drawings:
1. Submit shop drawings electronically in PDF format, drawn on sheets equal in size to Contract Documents of equipment specified for custom fabrication including all accessories attached to each item.
 2. Drawings shall be detailed and fully dimensioned to a minimum scale of 3/4"=1'-0" for plan and elevation views, and 1-1/2"=1'-0" for sections, based on the floor plan(s) and following item specifications. Drawings will be checked for thoroughness, accuracy, completeness, neatness, and returned for corrections, if necessary.
- C. Rough-in Drawings:
1. Submit rough-in drawings electronically in PDF format, drawn on sheets equal in size to Contract Documents of detailed arrangement plans professionally prepared from architects dimensioned plans (not traced from Contract Documents) at a minimum scale of 1/4"=1'-0".
 2. Equipment Layout Plan showing arrangement of all items specified and identified on schedule of equipment listing item number, description, quantity, manufacturer, model number, and remarks.
 3. Ventilation Plan showing dimensioned locations of all duct openings for ventilators and dishmachines identifying size, c.f.m. required (exhaust and supply), static pressures, and connection heights.
 4. Plumbing/Electrical Plans showing dimensioned locations, sizes, elevations and capacities of all utility services required for each item of equipment in relation to finished walls, columns, and heights above finished floor.
 5. Special Conditions Plan showing exact dimensions and details of all masonry bases, floor depressions, critical partition locations/heights, wall openings, reinforcing for wall and/or ceiling mounted equipment, and conduit locations for soda and compressed gas lines.
- D. Equipment Brochures:
1. Submit electronic files in PDF format of manufacturer's illustrations and technical data for approval prior to procurement. All items of Standard Manufacture shall be submitted, including items purchased to be built into fabricated equipment. Each illustration shall be marked to accurately describe the item to be furnished as specified. Include all deviations from standard information (i.e., voltage, phase, load, etc.).
 2. Include a separate information sheet ahead of each illustration sheet showing all service connection sizes, electrical requirements, loads, consumptions, and all accessories specified.
 3. Manufacturer's suggested schematic drawings for connection of mechanical and electrical services for such items as booster heaters, disposers, or any other item of equipment that may require the same.
- E. Miscellaneous Shop Drawings:
1. Submit electronic files in PDF format of manufactured equipment specified requiring clarification and approval such as, walk-in cooler/freezer drawings, ventilator drawings, utility raceway drawings, and refrigeration system drawings.
- F. Operation and Maintenance Manuals:
1. Submit electronic files in PDF format for all mechanically operated equipment of standard manufacture. Include operating and cleaning/maintenance instructions, parts listing, recommended parts inventory listing and purchase source, copy of warranties, and similar

- applicable information.
2. Brochure covers shall bear the job name, date, and name of contractor.
- G. Manufacturer's List:
1. The K.E.C. shall submit electronically in PDF format a list of all manufacturer's representatives of the food service equipment such as convection ovens, ranges, etc., and their authorized service agencies' addresses and telephone numbers; to be presented after submission of manufacture data.
- H. Samples:
1. Samples of materials, products, and fabrication methods, shall be submitted for approval upon request at no additional cost, before proceeding with work.
- I. Re-submission Requirements:
1. Shop Drawings:
 - a. Revise initial drawings as required and resubmit in accordance with submittal procedures.
 - b. Indicate on drawings all changes which have been made in addition to those requested by Consultant.
 2. Product Data and Samples:
 - a. Submit new data and samples as required for initial submittal.
 - b. Make all re-submittals within fourteen (14) working days from date of Consultants previous action.
- J. Approvals:
1. After approval of the submittals listed above, furnish as many prints and copies as are required for the various trades, the Owner, the Architect, and the Consultant.
 2. The approval of the shop drawings will be general and shall not relieve the K.E.C. of responsibility for proper fitting, finishing, quantities, and erection of work in strict accordance with the contract requirements, nor does it relieve him of the responsibility of furnishing material and workmanship not indicated on approved shop drawings but required for the completion of his work.
 3. Approval by the Consultant and/or Owner of the manufacturer's data submitted by the K.E.C. does not waive the responsibility of K.E.C. to furnish each item of equipment in complete compliance with the specifications and drawings. Discrepancies between Contract Documents and furnished equipment shall be corrected even after approval and installation of this equipment.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery:
1. Equipment shall be delivered to the job site only after the building is weather-safe and vandal-safe.
- B. Storage:
1. Store equipment in an area convenient to the point of installation in such a way that it is protected from the weather and job hazards.
- C. Protection:
1. Wrapping and protective coatings shall remain on all items until ready for use and in the case of stainless steel items, until installation is complete and the job is ready for cleaning.
- D. Damage:
1. All responsibility shall rest with the K.E.C. for any damage or loss incurred prior to final acceptance. Such items as may be lost or damaged shall immediately be replaced or repaired to a new condition to the complete satisfaction of and at no additional cost to the Owner.

1.7 JURISDICTION TRADE AGREEMENTS AND RESTRICTIONS

- A. Include the work specified, shown or reasonably infer able as part of foodservice equipment. Portions of this work may be subcontracted to those qualified to do such work, as may be necessary because of jurisdictional trade agreements and restrictions.

1.8 REGULATIONS AND CODES

- A. Except as otherwise indicated, each item of equipment shall comply with the latest current edition of the following standards as applicable to the manufacture, fabrication, and installation of the work in this section.
 1. N.S.F. Standards: Comply with National Sanitation Foundation Standards and criteria, and provide N.S.F. "Seal of Approval" on each manufactured item and major items of custom-fabricated work.
 2. U.L. Standards: For electrical components and assemblies, provide either U.L. labeled products or, where no labeling service is available, provide a complete index of the components used as selected from the U.L. "Recognized Component Index".
 3. A.N.S.I. Standards: For gas-burning equipment, comply with A.N.S.I. Z21-Series standards. Comply with A.N.S.I. B57.1 for compressed gas cylinder connections and with applicable standards of the Compressed Gas Association for water connection air gaps and vacuum breakers.
 4. A.G.A.: All gas-fired equipment shall be A.G.A. Approved, equipped to operate on the type gas available at the job site and shall contain 100% automatic safety shut-off devices.
 5. N.F.P.A. Standards: Comply with N.F.P.A. Bulletin 96 for exhaust systems and with N.F.P.A. Bulletins 17 & 96, and U.L. 300 for fire extinguishing systems.
 6. A.S.M.E. Code: Comply with A.S.M.E. boiler code requirements for steam generating and steam heated equipment. Provide A.S.M.E. inspection, stamps, and certification of registration with National Board.
 7. National Electric Code: Comply with N.E.C. Volume 5 for electrical wiring and devices included with foodservice equipment.
 8. All authorities having jurisdiction over this type of equipment and/or installation.
 9. Where specifications and/or drawings require mechanical, electrical or refrigeration work to be performed, such work shall be done in strict conformance to other portions of the Base Building Specification which sets forth standards for this type of work.
 10. Where there exists two standards or codes for one type of work, the stricter method shall govern.

1.9 WARRANTIES

- A. Warrantee in writing all equipment and fabrication against defects and workmanship for a period of two (2) years from date of acceptance.
 1. Each piece of mechanical equipment shall be listed, together with the authorized service and repair agency whom the Owner will call should malfunctions occur within the two-year (2) guarantee period.
- B. Refrigeration system compressors shall be warranted for five (5) years by the manufacturer. Free refrigeration service, including parts and labor, shall be furnished for two (2) years from date of acceptance, unless otherwise specified.

1.10 JOB CONDITIONS

- A. Visit the job site to field check actual wall dimensions and roughing-in and shall be responsible for fabricating and installing the equipment in accordance with the available space and utility services as they exist on the job site.

- B. Check all door openings, passageways, elevators, etc., to be sure that the equipment can be conveyed to its proper location within the building and if necessary, check the possibility of holding wall erection, placement of doorjambs, windows, etc. for the purpose of moving the equipment to its proper location with the General Contractor. Any removal and rebuilding of walls, partitions, doorjambs, etc. necessary to place the equipment, or if caused by incorrect information on the Contractor's drawings, shall be done at the expense of the K.E.C., at no additional cost to the Owner.
- C. Notify the Consultant and Owner before fabrication of equipment of any discrepancies between plans and specifications and actual conditions on the job.
- D. Before finished floors, walls, and/or ceilings are in place, physically check the location of all "rough-ins" at the job site. Report discrepancies in writing.
- E. Any changes required after fabrication has been started to ensure equipment accurately fitting the space as it exists and conforming to actual field dimensions on the job shall be made at no additional cost to the Owner.
- F. If special hoisting equipment and operators are required, include such cost as part of the bid for this work.

1.11 CHANGES IN THE WORK

The Owner reserves the right to require reasonable modification to be made in the routing of work and relocation of equipment. This specifically refers to conditions where interference occurs or where more desirable accessibility can be obtained or whose materials cannot be installed because of structural or mechanical conditions encountered. Such changes shall be made at no additional cost to the Owner.

1.12 PATENTS

- A. Hold harmless and save the Owner and its officers, consultants, servants and employees from liability of any nature or kind, including costs and expenses for or on account of any copyrighted, patented, or un-patented invention, process, trademark, design, device, material, article, or appliance manufactured or used in the performance of the contract, including its use by the Owner, unless otherwise specifically stipulated in the Contract Documents.
- B. If the Contractor has information that the process or article specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Owner in writing. The contract price shall include all royalties or costs arising from the use of any or all of the above which are, in any way, involved in the contract.

1.13 CONTRACTOR'S WARRANTY

- A. The Contractor represents and warrants:
 - 1. That he is financially solvent and that he is experienced in and competent to perform the types of work or to furnish the plans, materials, supplies or equipment, to be so performed or furnished by him.
 - 2. That he is familiar with all Federal, State, municipal, and department laws, ordinances, orders, and regulations, which may, in any way, affect the work of those employed therein, including, but not limited to, any special acts relating to the work or to the project of which it is a part.
 - 3. That such temporary and permanent work required by the contract as is to be done by him can be satisfactorily constructed and used for the purpose for which it is intended and that such construction will not injure any person or damage any property.
 - 4. That he has carefully examined the plans, specifications, addenda, if any, and the site of the work and that, from his own investigations, he has satisfied himself as to the nature and

location of the work, the character, quality, and quantity of materials likely to be encountered, the character of equipment and other facilities needed for the performance of the work, the general and local conditions, and all other materials which may, in any way, affect the work or its performance.

5. That he has satisfied himself as to the existing openings and accesses to the foodservice area through which his equipment shall be required to pass and that he is responsible for his equipment being delivered in as many sections as necessary to conform to the available space dictated by these existing limitations.

1.14 SUBSTITUTIONS

- A. Bids submitted shall be for the specific manufacturer and model, size, capacity, and accessories, as specified or shown on the drawings.
- B. The K.E.C. may quote upon brands and models of equipment other than those specified as a substitute, but he must also bid the primary item. In the event that it is desired to request approval of substitute material, product, article, process, or item of equipment in lieu of that which is specified, submit a written request at the time of submitting bid on a separate sheet attached to, but not part of, the base bid, setting forth the proposed substitution in detail, including an itemized analysis of the addition or deduction in the amount of the contract, if any, which will result if the substitution is approved. Each such request shall include a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data and any other data or information necessary for a complete evaluation.
- C. The Contractor shall be held responsible for additional costs to himself or any other prime contractor for changes required to install materials, devices, equipment, etc., which the Contractor has substituted for that specified.
- D. Whenever any product is specified in the Contract Documents by reference to the name, trade name, make, or catalog number of any manufacturer or supplier, the intent is not to limit competition but to establish a standard of quality which is necessary for the project. Products of other manufacturers meeting the established criteria will be considered. However, please take note that the plumbing, electrical, steam, heating, ventilating, and air-conditioning drawings prepared by the consulting engineers, have been engineered based on the first product named under each item number designation. Therefore, any other product which is submitted for approval in lieu of the primary item specified, shall conform to the rough-in requirements established for the first product named, as well as physical size and building construction requirements.
- E. Any equipment listed, which is not in accordance with the provisions of these specifications, will be rejected. If the Contractor fails to submit for approval within the specified time the list of equipment as required herein, the Consultant shall then have the right to make the final equipment selection. The selection made by the Consultant shall strictly conform to these specifications and will be final and binding, and the items shall be furnished and installed by the Contractor without change in the contract price at the time of completion.
- F. It shall be the responsibility of the K.E.C. to prove that substitutions are equal to specified items. **NYIKOS ASSOCIATES, INC.** as the Owner's representative, shall be the determining authority as to the acceptability or equality of the substitutions. No substitutions shall be approved after bids are received.

1.15 DESIGN/MODEL CHANGE, DISCONTINUED ITEMS

- A. All equipment specified shall be of latest design. Any improvements made in design and construction of prefabricated items before equipment is actually delivered to the project site, shall

be incorporated in equipment, at no additional cost, provided such incorporation does not delay delivery date of equipment.

- B. In the event of an item being discontinued after specified and prior to delivery to project site, the K.E.C. shall be responsible for notifying the Consultant in writing of the discontinued item and request an alternate of equal performance, including all accessories.

PART 2 PRODUCTS

2.1 GENERAL

- A. The equipment and its component parts shall be new and unused. All items of standard manufactured equipment shall be current models at the time of delivery. All parts subject to wear, breakage, or distortion shall be accessible for adjustment, replacement, and repair.
- B. Means shall be provided to ensure adequate lubrication for all moving parts. All oil holes, grease fittings, and filler caps shall be accessible without the use of tools.
- C. The design of the equipment shall be such as to provide for safe and convenient operation. Covers or other safety devices shall be provided for all items of equipment presenting safety hazards. Such guards or safety devices shall not present substantial interference to the operation of the equipment. All guards shall provide easy access to the guarded parts.
- D. Trim shall not be an acceptable substitute for accuracy and neatness. When trim is required and accepted by the Consultant and the Owner in lieu of rejection of items of equipment, it shall be the K.E.C.'s responsibility to provide same at no additional cost.
- E. Unless otherwise specified herein, no material lighter than #20 gauge shall be incorporated into the work. All gauges for sheet iron and sheet steel shall be U.S. Standard Gauges, and finished equipment gauge thickness shall not vary more than 5% plus or minus from the thickness indicated below.

<u>GAUGE</u>	<u>THICKNESS</u>	<u>GAUGE</u>	<u>THICKNESS</u>
#10	0.1406	#16	0.0625
#12	0.1094	#18	0.0500
#14	0.0781	#20	0.0375

- F. Materials or work described in words which have a well known and acceptable trade meaning shall be held to refer to such accepted meanings.

2.2 MATERIALS

- A. Refrigeration Systems:
1. Self-contained:
 - a. Whether the units be top-mounted or cabinet-mounted, they shall be started by the K.E.C. and shall be tested for maintenance of temperature.
 - b. All units shall be furnished with condensate evaporators.
 2. Remote: Provide and install complete refrigeration system(s), charged, started, and operating properly, according to the Item Specifications and the following.
 - a. Single stage compressors with air-cooled condensers operating within the recommended range of suction discharge pressure of economical operation and within the required capacity.
 - b. All units shall be new and factory assembled, to operate with the refrigerant specified. Refrigerant R-404A shall be used for all medium and low temperature applications. Due to the unsettled nature of refrigerants, no refrigerant shall be used with a phase-out date of less than ten (10) years from the date of installation.
 - c. Compressors shall be accessible hermetic type, Copeland or approved equal, and shall be equipped with high-low pressure control, liquid line drier, sight glass, suction and discharge vibration eliminator, and head pressure control.

- d. The system shall have a factory mounted and pre-wired control panel complete with main fused disconnect, compressor circuit breakers, contactors, and time clocks wired for single point power connection.
 - e. The supporting frame shall be constructed of structural steel, fully welded, and protected against rust and corrosion with one (1) coat primer, and two (2) coats paint, unless otherwise specified.
 - f. Systems specified for outdoor installation shall be fully protected in a weather-proofed housing with louvered front panel and hinged top, constructed to resist rust and corrosion, and furnished with low ambient controls. Crankcase heater shall be provided with every compressor.
3. Where specifications call for pre-piped lines (i.e., from a fixture to a valve compartment, etc.), provide such work in strict conformance with other sections of the specifications which set forth standards for this type of work or in conformity with the requirements of the Board of Fire Underwriters or ASHRAE Standards, whichever is greater.
 4. Each refrigeration item specification is written to provide minimum specifications and scope of work. All refrigeration equipment shall be designed and installed to maintain the following general temperatures unless otherwise specified.

<u>TYPE</u>	<u>REFRIGERATORS</u>	<u>FREEZERS</u>
a. Walk-In	+35° F./1.7° C.	-10° F./-23.3° C.
b. Reach-In	+35° F./1.7° C.	-10° F./-23.3° C.
c. Undercounter	+35° F./1.7° C.	-10° F./-23.3° C.
d. Fabricated	+35° F./1.7° C.	-10° F./-23.3° C.
e. Cold Pans	+0° F./-17.8° C.	
f. Work Rooms	+50° F./10° C.	

5. Provide (including payment if subcontracted) all electrical and refrigeration components needed by the completed system and complete (or have completed by the respective trades) all connections of and to said components.
 6. An evaporator coil defrost system shall be provided and installed by the K.E.C. on all refrigeration systems designed to operate at an evaporator coil temperature of less than +35° F. Evaporator coil units provided without electric defrost feature shall be installed with a solenoid valve in the liquid line, controlled by the time clock so as to shut off the flow of refrigerant and allow the compressor to pump down and shut off by activation of the pressure control switch.
 7. Verify the requirements of and provide any or all additional refrigeration specialty(s) or component(s) required or recommended by the manufacturer for proper operation under the specific operating conditions and location of each system specified.
 8. Verify and provide manufacturer's certification that the equipment selection hereinafter specified for each refrigeration system is properly sized and shall meet the operating requirements set forth for each system regarding maintaining specified operating temperature, hours of compressor running time, and system pressures and velocities as recommended by the equipment manufacturer(s).
 9. All refrigeration systems shall be installed and wired in strict conformance with the manufacturer's instructions and recommendations.
- B. Motors and Heating Elements:
1. Motors up to and including 1/2 HP shall be wired for 120 volt, single phase service. Motors larger than 1/2 HP shall be wired for 208 volt, single or three phase service as indicated. Motors shall be of the drip-proof, splash-proof, or totally enclosed type, having a continuous duty cycle and ball bearings, except small timing motors which may have sleeve bearings. All motors shall have windings impregnated to resist moisture. Motors located where subject to deposits of dust, lint, or other similar matter shall be of the totally enclosed type. Motors

- shall have ample power to operate the machines for which designated under full load operating conditions without exceeding their nameplate ratings. Insulation shall be N.E.M.A. Class B or better.
2. Heating elements having a connected load up to and including 1,000 watts shall be wired for 120 or 208 volt, single phase service, or as indicated on the drawings.
 - a. Any heating element larger than 1,000 watts or any combination of elements in one fixture totaling more than 1,000 watts shall be wired for 208 volt single or three phase service, as indicated on the drawings.
 - b. Fixtures having multiple heating elements may be wired for three phase service with the load balanced as equally as possible within the fixture.
- C. Switches and Controls:
1. Provide recognized commercial grade signals, "on-off" pushbuttons or switches, and other speed and temperature controls as required for operation of each item, complete with pilot lights and permanent graphics, conspicuously labeled, to assist the user of each item.
 2. Mount switches and controls directly adjacent the piece of equipment for which it involves, on operator's side of counter body apron, out of view to the public.
 3. Provide on or for each motor-driven appliance or electrical heating or control unit, a suitable control switch or starter of the proper type and rating and in accordance with Underwriter's Code wherever such equipment is not built in. All other line switches, safety cut-outs, control panels, fuse boxes, other control fittings and connections, when not an integral part of the unit or furnished loose by the manufacturer will be furnished and installed by the Electrical Contractor, unless otherwise specified. All electrical controls, switches, or devices provided loose for field installation as a part of the item specified shall be installed in the field by the Contractor unless otherwise specified.
 4. Appliances shall be furnished complete with motors, driving mechanisms, starters, and controllers, including master switches, timers, cut-outs, reversing mechanisms, and other electrical equipment if and as applicable.
- D. Cover Plates:
1. All controls mounted on vertical surfaces of fixtures shall be set into recessed die stamped stainless steel cups, or mounted onto removable cover plates in such a fashion as to not protrude or interfere with the operation of each item.
 2. Cover plates shall be furnished and installed for all electrical outlets, receptacles, switches and controls furnished by the K.E.C., and shall match the material and finish of the equipment to which they will be fastened.
- E. Wiring and Conduit:
1. Wiring shall be properly protected in N.E.M.A. and U.L. approved metal enclosures. Only rigid steel conduit shall be used, zinc coated where unexposed and chrome plated where exposed. All wiring shall be run concealed wherever possible.
 2. All equipment furnished under this contract shall be so wired, wound, or constructed so as to conform with the electrical characteristics at the job site.
 3. Wiring and connection diagrams shall be furnished with electrically operated machines and for all electrically wired fabricated equipment.
 4. Furnish all foodservice equipment completely wired internally using wire and conduit suitable for a wet location. Where an Electrician's services are required, the work shall be done in the K.E.C.'s factory or at his expense at the job site. Provide all electrical outlets and receptacles required to be mounted on or in fabricated equipment and interconnect to a master circuit breaker panel with all wires neatly tagged showing item number, voltage characteristics, and load information. Final connection shall be made by the Electrical Contractor.

F. Cords, Plugs, and Receptacles:

1. The Electrical Contractor shall provide three- or four-wire, grounding-type receptacles for all wall and floor mounted outlets to be used for plug-in equipment with characteristics as noted on the drawings. Provide "Hubbell" three-wire or four-wire grounding-type connectors and neoprene cords installed on each item of plug-in equipment, as indicated on drawings and item specifications.
2. K.E.C. shall coordinate with the Electrical Contractor so that the receptacles provided will match the specific plugs provided as part of the plug-in equipment. Any changes in cords and plugs required in the field due to lack of coordination between the Electrical Contractor and the K.E.C. shall be the latter's responsibility.
3. Reduce the length of all cords furnished with the specified equipment to a suitable or appropriate length so they do not interfere with other equipment or operations.
4. Pedestal receptacles that are part of fabricated equipment exposed to view, shall be similar to T&S Model No. B-1508DD single face, single gang or Model No. B-1528DD single face, double gang.

G. Water Inlets:

1. Water inlets shall be located above the positive water level wherever possible to prevent siphoning of liquids into the water supply system. Wherever conditions shall require a submerged inlet, a suitable type of check valve (except in jurisdictions where check valves are prohibited) and vacuum breaker shall be placed on the fixture to form a part of same to prevent siphoning. Where exposed to view, piping and fittings shall be chrome-plated.

H. Drain Lines:

1. Plumbing Contractor shall provide and install indirect waste lines from equipment which will discharge into floor drains or safe wastes in accordance with Plumbing Rough-In Plans, chrome-plated where exposed. Extend to a point at least 1" (or as required by local codes) above the rim of the floor drain, cut bottom on 45° angle and secure in position.
2. All horizontal piping lines shall be run at the highest possible elevation and not less than 6" above finished floor, through equipment where possible.
3. No exposed piping in or around fixtures or in other conspicuous places shall show tool marks of more than one thread at the fitting.
4. All steam operating valves on or in fabricated and purchased foodservice equipment shall be provided with composition hand wheels, which shall remain reasonably cool in service.
5. Provide suitable pressure regulating valves for all equipment with such components that might reasonably be expected to be affected over a period of time by adverse pressure conditions.

I. Faucets, Valves and Fittings:

1. All sinks shall be fitted with chromium plated, swing spout faucets of same manufacturer throughout as follows, or otherwise specified in Item Specifications.
 - a. Prep and Utility Sinks:
 - 1.) Splash-Mounted:
 - a.) T&S Brass and Bronze Works, Inc., Model B-231.
 - b.) Fisher Manufacturing Company, Model 3253.
 - 2.) Deck-Mounted:
 - a.) T&S Brass and Bronze Works, Inc., Model B-221.
 - b.) Fisher Manufacturing Company, Model 3313.
 - b. Pot Sinks:
 - 1.) Splash-Mounted:
 - a.) T&S Brass and Bronze Works, Inc., Model B-290.
 - b.) Fisher Manufacturing Company, Model 5214.
2. Pre-Rinse Assemblies:

- a. Splash-Mounted:
 - 1.) T&S Brass and Bronze Works, Inc., Model B-133 with B-109 wall bracket.
 - 2.) Fisher Manufacturing Company, Model 2210 with 2902-12 wall bracket.
 - b. Deck-Mounted:
 - 1.) T&S Brass and Bronze Works, Inc., Model B-143 with B-510 mixing valve and B-109 wall bracket.
 - 2.) Fisher Manufacturing Company, Model 2810 with 2805-CV mixing valve and 2902-12 wall bracket.
 3. Vacuum Breakers:
 - a. General Use:
 - 1.) Fisher Manufacturing Company, Model 3990-8000.
 - b. Disposers:
 - 1.) Splash-Mounted:
 - a.) T&S Brass and Bronze Works, Inc., Model B-455.
 - b.) Fisher Manufacturing Company, Model 3990.
 - 2.) Deck-Mounted:
 - a.) T&S Brass and Bronze Works, Inc., Model B-456.
 - b.) Fisher Manufacturing Company, Model 3991.
 4. Trough Inlets:
 - a. Fisher Manufacturing Company, Model No. 2905.
 5. Other specialty faucets, pre-rinse assemblies, vacuum breakers, and trough inlets, as specified under Item Specifications.
 6. All sink compartments shall be fitted with 2" NPT male, chrome-plated, brass rotary waste valves complete with overflow assemblies and stainless steel strainers.
 - a. Prep and General Utility Sinks:
 - 1.) Fisher Manufacturing Company, Model No. 6100.
 - b. Pot Sinks:
 - 1.) Fisher Manufacturing Company, Model No. 6102.
 7. Refer to Division 22 for all other fittings.
- J. Metals and Alloys:
1. Stainless steel sheets shall conform to ASTM 240, Type 302, Condition A, 18-8, of U.S. Standard Gauges as previously indicated under paragraph 2.1.E.
 - a. All exposed surfaces shall have a No. 4 finish. A No. 2B finish shall be acceptable on surfaces of equipment not exposed to view.
 - b. All sheets shall be uniform throughout in color, finish, and appearance.
 - c. Rolled shapes shall be of cold rolled type conforming to ASTM A36.
 2. Stainless steel tubing and pipe shall be Type 304, 18-8, having a No. 4 finish, and shall conform to either ASTM A213 if seamless or ASTM A249 if welded.
 3. Where galvanized metal is specified, it shall be copper-bearing galvanized iron, cold-rolled, stretcher leveled, bonderized, re-rolled to insure a smooth surface, and used in the largest possible sizes with as few joints as necessary.
 4. Galvanizing shall be applied to rolled shapes in conformance with ASTM A123, and to sheets in conformance with ASTM A526, coating designation G-90.
- K. Castings:
1. Castings shall consist of corrosion resisting metal (white metal) containing not less than 30% nickel. All castings shall be rough ground, polished, and buffed to bright lustre and free from pit marks, runs, checks, burrs, and other imperfections. In lieu of corrosion resisting metal castings, die-stamped or cast 18-8 stainless steel will be acceptable.
- L. Hardware and Casters:
1. All hardware shall be of heavy-duty type, satin finished chromium plated brass, cast or

- forged or highlighted stainless steel of uniform design. All hardware shall be a well-known brand, and shall be identified by the manufacturer's name and model number for easy replacement of broken or worn parts.
2. Casters on custom-built equipment shall be heavy-duty type, ball bearing, solid or disc wheel, with grease-proof rubber, neoprene, or polyurethane tire. Wheel shall be 5" diameter, minimum width of tread 1-3/16", minimum capacity per caster 250 pounds, unless otherwise noted.
 - a. Solid material wheels are to be provided with stainless steel rotating wheel guard.
 - b. All casters shall have sealed wheel and swivel bearings, polished plated finish and be N.S.F. approved.
 - c. All equipment specified with casters shall have a minimum of two (2) with brakes installed on opposite corners, unless otherwise noted.
- M. Locks:
1. When specified, doors and drawers of all custom fabricated or manufactured equipment shall be provided with cylinder locks, disc tumbler type with stainless steel faceplate as manufactured by Standard-Keil Mfg. Co., or approved equal.
 - a. Provide two (2) sets of keys for each lock.
 - b. All locks shall be keyed alike, except at cashiers stations or unless otherwise specified.
- N. Thermometers:
1. All fabricated refrigerated compartments shall be fitted with exterior mounted, adjustable, dial or digital thermometers with flush bezels, and shall be calibrated after installation.
- O. Sealants:
1. Sealant, wherever required, shall conform to ASTM C 920; Type S Grade NS, Class 25, Use Nt, with characteristics that when fully cured and washed meets requirements of Food and Drug Administration Regulation 21 CFR 177.2600 and N.S.F. RTV-732 for use in areas where it comes in contact with food.
 2. Dow-Corning #780 or General Electric "Silastic", or approved equal, in either clear or approved color to match surrounding surfaces and applied in accordance with sealant manufacturers recommendations for a smooth, sealed finish.

2.3 FABRICATION AND MANUFACTURE

- A. Materials and Workmanship:
1. Unless otherwise specified or shown on drawings, all materials shall be new, of best quality, perfect, and without flaws. Material shall be delivered and maintained on the job in an undamaged condition.
 2. Fabrication shall be equal to the standards of manufacture used by all first class equipment manufacturers, performed by qualified, efficient, and skilled mechanics of the trades involved.
 3. All items of standard equipment shall be the latest model at time of delivery.
 4. All fabricated work shall be the product of one manufacturer of uniform design and finish.
 5. Each fabricated item of equipment shall include all necessary reinforcing, bracing, and welding with the proper number and spacing of uprights and cross members for strength.
 6. Wherever standard sheet sizes will permit, the tops of all tables, shelves, exterior panels of cabinet type fixtures, and all doors and drainboards shall be constructed of a single sheet of metal.
 7. Except where required to be removable, all flat surfaces shall be secured to vertical and horizontal bracing members by welding or other approved means to eliminate all buckle, warp, rattle, and wobble. All equipment not braced in a rigid manner and which is subject to rattle and wobble shall be unacceptable, and the K.E.C. shall add additional bracing in an approved manner to achieve acceptance.

B. Sanitary Construction:

1. All fabricated equipment shall be constructed in strict compliance with the standards of the National Sanitation Foundation as outlined in their Bulletin on Food Service Equipment entitled "Standard No. 2" dated October 1952, and in compliance with the local and State Public Health Regulations in which the installation will occur.
2. All fabricated equipment shall bear the N.S.F. "Seal of Approval".

C. Construction Methods:**1. Welding:**

- a. All welding shall be the heliarc method with welding rod of the same composition as the sheets or parts welded. Welds shall be complete, strong, and ductile with excess metal ground off and joints finished smooth to match adjoining surfaces; free of mechanical imperfections such as gas holes, pits, cracks, etc., and shall be continuously welded so that the fixtures shall appear as one-piece construction. Butt welds made by spot solder and finished by grinding shall not be acceptable.
- b. Spot welds shall have a maximum spacing of 3". Tack welds shall be of at least 1/4" length, and spaced no greater than 4" from center to center. Weld spacing at the ends of the channel battens shall not exceed 2" centers.
- c. In no case shall soldering be considered as a replacement for welding, nor shall any soldering operation be done where dependence is placed on stability and strength of the joint.
- d. Fixtures shall be shop fabricated of one piece and shipped to the job completely assembled wherever possible. Equipment too large to transport or enter the building in one piece shall be constructed so that the field joints can be welded at the job site.
- e. All exposed joints shall be ground flush with adjoining material and finished to harmonize therewith. Whenever material has been sunk or depressed by welding operation, depression shall be suitably hammered and peened flush with the adjoining surface and ground to eliminate low spots. In all cases the grain of rough grinding shall be removed by successive fine polishing operations.
- f. All unexposed welded joints on undershelves of tables or counters of stainless steel shall be suitably coated at the factory with an approved metallic-based paint.
- g. After galvanized steel members have been welded, all welds and areas where galvanizing has been damaged shall have a zinc dust coating applied in conformance with Military Specification Number MIL-P-26915.

2. Joints:

- a. Butt joints and contact joints, wherever they occur, shall be close fitting and shall not require a filler. Wherever break bends occur, they shall be free of undue extrudence and shall not be flaky, scaly, or cracked in appearance; where such breaks do mar the uniform surface appearance of the material, all such marks shall be removed by suitable grinding, polishing, and finishing. Wherever sheared edges occur, they shall be free of burrs, fins, and irregular projections and shall be finished to obviate all danger of laceration when the hand is drawn over them. In no case shall overlapping materials be acceptable where miters or bullnosed edges occur.
- b. Field welded joints shall be ground smooth without dips and irregularities and finished to match original finish.

3. Bolt, Screw and Rivet Construction:

- a. All exposed surfaces shall be free from bolt and screw heads. When bolts are required, they shall be of the concealed type and be of similar composition as the metal to which they are applied.
- b. Where bolt or screw threads on the interior of fixtures are visible or may come into contact with hands or wiping cloths, they shall be capped with a stainless steel or

- chrome acorn nut and stainless steel lock washer.
- c. If rivets are used to fasten rear paneling to the body of the fixture, such rivets shall be stainless steel. In no case shall iron rivets be used.
- 4. Sound Deadening:
 - a. Schnee Butyl-Sealant 1/2" wide rope continuously between all frame members and underside of stainless steel table tops, overshelves and undershelves.
 - b. Tighten stud bolts for maximum compression of sealant.
- 5. Hi-Liting:
 - a. All horizontal edges of stainless steel tops, splashes, tops of raised rolled rims, and edges of all exposed doors, handles and shelf edges shall be hi-lited, in uniform design by grinding with abrasive not coarser than #240 grit, then polishing with compound to a uniform mirror finish.
- 6. Polishing:
 - a. The grain of polishing shall run in the same direction on all horizontal and on all vertical surfaces of each item of fabricated equipment except in the case where the finish of the horizontal sections of each shall terminate in a mitered edge.
 - b. Where sinks and adjacent drainboards are equipped with backsplash, the grain of the polishing shall be consistent in direction throughout the length of the backsplash and sink compartment
- 7. Finishes:
 - a. Paint and coatings shall be of an N.S.F. approved type suitable for use in conjunction with foodservice equipment. Such paint or coating shall be durable, non-toxic, non-dusting, non-flaking and mildew resistant, shall comply with all governing regulations, and shall be applied in accordance with the manufacturers recommendations.
 - b. All exterior, galvanized parts, exposed members of framework, and wrought steel pipe where specified to be painted shall be cleaned, primed with rust inhibiting primer, degreased, and finished with two (2) coats of glossy enamel grey hammertone paint, unless otherwise noted.
 - c. Where baked enamel finishes are specified, they shall be oven baked on the fixtures for a minimum of 1-1/2 hours at a minimum temperature of 300° Fahrenheit.
 - d. Fabricated equipment shall be spray coated with plastic suitable for protecting the equipment during transport and installation. The coating shall be easily removable after the equipment installation is complete at the job site, and final clean-up has begun.
- D. Construction:
 - 1. Legs:
 - a. All tubular stands for open base tables, sinks, or dishtables shall have legs constructed of 1-5/8" O.D. stainless steel tubing, with 1-1/4" O.D., #16 gauge stainless steel crossbracing running between legs at a point 10" above finished floor.
 - b. All joints between legs and crossbracing shall be welded and ground smooth, full 360°F.
 - c. The top end of legs shall be closely fitted into fully-enclosed stainless steel conical gussets no less than 3" high, similar to Klein #481-58 or #483-58, or approved equal.
 - d. Gussets shall be fully welded to framing reinforcing members, so that, set screw is not visible from front.
 - e. Legs without crossrails will not be accepted.
 - f. Legs shall be spaced at not more than 5'-6" on centers, unless otherwise specified.
 - 2. Feet:
 - a. All tubular legs will be swedged for appearance and close fit to United Show Case #BF-158, or approved equal, fully enclosed, stainless steel bullet-shaped foot.
 - 1.) The foot shall be threaded into a collar and completely welded inside the tubular leg to permit a maximum adjustment of 2" without any thread exposure.

- 2.) Threads shall be National Course Series Class 2 fit or better, machined to prevent end play when foot is at maximum adjustment.
- 3.) The bullet-shaped foot shall have slightly rounded bottom to protect the floor, and a minimum bearing surface of 3/4" diameter of stainless steel-to-floor contact.
- 4.) Bottom of tubular leg shall be finished off smoothly to provide a sanitary fitting and prevent the accumulation of grease or other debris.
- b. Cabinet type fixtures shall be mounted on 8" high die-stamped, sanitary, two-piece stainless steel legs no less than 2-3/4" in diameter at the top, Component Hardware #A72-0811, or approved equal.
 - 1.) The bottom fully enclosed, stainless steel, bullet-shaped foot threads up into the inside of the upper member, with a male threaded 5/8" bushing to permit maximum adjustment of 2" without thread exposure.
 - 2.) The upper section shall be stamped in a neat design with a flared inverted shoulder and fully welded to a base plate designed for anchoring to the channel underbracing.
3. Table Tops:
 - a. Tables shall be constructed of stainless steel, and of a thickness not less than #14 gauge with 1-3/4" by 120° rolled edges, or as otherwise specified and detailed.
 - b. All corners shall be bull-nosed and of the same radius as rolled edges.
 - c. Joints where required shall be butt-welded and ground smooth to present a uniform one-piece appearance.
 - d. All tops shall be reinforced on the underside with a fully welded framework of 1-1/2"x1-1/2"x1/8" galvanized steel angles with the framing extending around the top perimeter and crossbraced on 24" maximum centers.
 - e. 1"x4"x1" galvanized or stainless steel, fully welded, cross channel, closed end members placed at each pair of legs with one (1) channel running lengthwise will also be acceptable.
 - f. All tops shall be reinforced so that there will be no noticeable deflection.
 - g. Metal tops where adjacent to walls or other items of equipment, shall be constructed with integral, coved, back and/or endsplashes as required and specified in accordance with the standard details contained herein. Close all ends of splashes.
4. Enclosed Bases:
 - a. All enclosed bases or cabinet bodies shall be of seamless #18 gauge stainless steel construction, enclosed on the ends and sides as required and called for under each item.
 - b. Ends of body shall terminate at front or operator's side in a 2" wide mullion, vertical, and completely enclosed. All intermediate mullions shall be completely enclosed.
 - c. The bases shall be reinforced at the top with a framework of 1-1/2"x1-1/2"x1/8" galvanized angles, with all corners mitered and welded solid.
 - d. Underside of top shall be reinforced with channels and gussets where necessary. Additional angles and cross members shall be provided to reinforce shelves and support tops under heavy tabletop equipment.
 - e. Where sinks or other drop-in equipment occur, provide additional reinforcing extending crosswise, both sides of opening.
 - f. In the case of fixtures fitting against or between walls, the bodies shall be set in 1" or 2" from the wall line, with the tops continuing to the wall line with integral, coved splashes as specified. Extend vertical face of body to the wall line only. This will permit adjustment to wall irregularities. Vertical trim strips will not be accepted.
 - g. Bodies shall be fitted with counter style stainless steel legs as hereinbefore specified.
5. Drawers:
 - a. Drawers, where specified, shall have removable pan inserts of #18 gauge stainless steel, and shall be approximately 20"x20"x5" deep unless otherwise specified.

- 1.) Perimeter top edge shall be flanged out 1/2".
 - 2.) All interior horizontal corners shall be rounded on a 1" radius, and all interior vertical corners shall be rounded on a 2" radius.
 - b. Fronts shall be double pan #16 gauge stainless steel construction, 1" thick, insulated with a semi-rigid, fiberglass board, unfaced, having a three-pound density.
 - 1.) The top of the drawer face shall be formed as an integral pull by breaking the front pan back on a 45° angle 1", then straight up 1", back to front 1", and then down at the front 3/4".
 - 2.) Drawer front shall have all edges and corners ground smooth with a radius edge pull.
 - 3.) Provide hard rubber button bumpers attached to rear of drawer face at each corner.
 - c. The drawer shall have an all welded frame of 1"x1", #16 gauge stainless steel angles sized to fit the removable pan insert.
 - d. Drawers shall operate on #14 gauge full-extension slides with stainless steel roller bearings with hardened and ground raceways, Component Hardware, S52 Series, or approved equal. Slides shall be pitched approximately 3/8" per foot to permit self closing action.
 - e. Drawers shall be adequately and neatly fitted to the guides to permit easy operation without rattle or binding.
 - f. Slides and frame shall be reinforced to support a dead weight of 150 pounds when drawer is fully extended.
 - g. Adjustable stops shall be provided for each drawer at the fully-opened position, and be readily liftable by hand for easy removal of drawer.
 - h. All drawers not mounted inside a cabinet body shall be completely enclosed in an #18 gauge stainless steel box-type enclosure and suspended from angle framing under the fixture top. The housing bottom shall be flanged and welded to an #18 gauge stainless steel reinforcing channel extending across the open end.
6. Sliding Doors:
- a. Sliding doors shall be of the double pan type, with the exterior pan constructed of #18 gauge stainless steel with all four sides channeled and corners welded. The interior pan shall be similarly constructed of #20 gauge stainless steel, set into the exterior pan, and welded in place.
 - b. All doors shall be insulated with semi-rigid fiberglass board, un-faced, having a three-pound density. Styrofoam shall not be acceptable.
 - c. Doors 18" wide or greater, shall have internally welded 4" wide reinforcing channels to prevent warpage.
 - d. Each door shall be fitted with a positive flush-type stainless steel pull, Standard-Kiel #1262-1014-1283 recessed handle, or approved equal.
 - e. In the back of each door install a 1"x1", #16 gauge stainless steel angle stop welded in a suitable location to prevent the doors from overpassing the flush pulls.
 - f. Doors in the closed position shall overlap each other by no more than 2".
 - g. Each door shall be fitted with two (2), 1-3/8" ball bearing sheaves fastened to 1"x1/8" stainless steel bar stock welded to the top corners of each door for suspending on an overhead #16 gauge stainless steel channel track. The hangers shall be tapped for 1/4"-20 thumb screw vertical locks which prevent the doors from jumping the track in operation while permitting easy removal for cleaning without tools.
 - h. Insure that the bottom of the doors are positively and continuously guided to assure proper alignment and passing regardless of the position of each door.
 - i. Provide hard rubber bumpers for doors to close against to insure quiet operation.
7. Hinged Doors:
- a. Hinged doors shall be of the same materials and construction as sliding doors previously

- specified.
- b. Hinges shall be heavy duty, stainless steel, removable type, and fastened by tapping into 1/4"x3/4" stainless steel bar stock inside the door pan and behind the door jamb.
 - c. The door face shall be flush with the cabinet body when fully closed.
 - d. Size widths of doors equally when installed in pairs, or in series with other pairs, with no door being greater than 36" in width.
 - e. Doors shall be held closed by permanent magnetic closure devices of an approved type and of sufficient strength to hold the doors shut. Install two (2) per door (minimum), mounted to the door jamb, top and bottom, with opposing chrome-plated steel plates securely fastened to the inner panel of the doors.
8. Undershelves:
- a. All open base tables shall be provided with full-length undershelves of #16 gauge stainless steel fully welded to legs with all joints ground smooth and polished.
 - b. Front edge shall turn down 1-1/2" and under 1/2".
 - c. Turn up rear and ends 2", with integral coved radius, when specified.
 - d. If required by width, provide 1-1/2"x1-1/2"x1/8" galvanized angle bracing mounted to underside, full length.
9. Interior Shelves:
- a. All interior shelves within cabinet bodies, enclosed bases and overhead cabinets, shall be of #16 gauge stainless steel.
 - b. Removable shelves shall be constructed in equal sections, and rest in 1-1/2"x1-1/2"x1/8" stainless steel angle frame. Cove all horizontal corners in accordance with N.S.F. requirements.
 - c. Stationary shelves shall have 2" turn-up on back and ends, and continuously welded to cabinet body, polished and ground smooth to form a one-piece interior free of any crevices.
 - d. Front edge shall turn down 1-1/2" and under 1/2", and finished with "z" bar forming completely enclosed edge for maximum strength and sanitation.
 - e. Provide 1-1/2"x1-1/2"x1/8" angle bracing mounted to underside, full length.
10. Elevated Shelves:
- a. Shelves over equipment not adjacent to a wall shall be mounted on 1" diameter #16 gauge stainless steel tubular standards neatly fitted with stainless steel base flanges, unless otherwise specified.
 - b. The top of the tubular standards shall be completely welded to #14 gauge stainless steel support channels, full width of overshef.
 - c. Inside the tubular standard, and welded to same, provide 1/2" diameter steel tension rod extended through countertop and securely anchored to lower framework reinforcing with nuts and lock washers in such a manner as to assure a stable, sway-free structure.
 - d. If required by width, provide 1-1/2"x1-1/2"x1/8" stainless steel angle bracing mounted to underside, full length.
 - e. Cantilevered shelves, when called for, shall be #16 gauge stainless steel supported on #14 gauge stainless steel brackets welded to 1-5/8" O.D. stainless steel tubular standards extending through the backsplash, and fully welded to the table framework. Provide Klein #481-SH welded sleeves where standards penetrate backsplash.
11. Wall Shelves:
- a. Open wall shelves shall be constructed of #16 gauge stainless steel with back and ends turned up 2", positioned 2" out from face of wall, with all corners welded, and supported on #14 gauge stainless steel brackets.
 - b. Brackets shall be flanged inward beneath the shelf and at the wall 1-1/2" with intersecting flanges completely welded, and attached to shelf with studs welded to the underside and bolted with stainless steel lock washers and chrome-plated cap nuts.

- c. Each bracket shall be fastened to the wall with a minimum of two (2) 1/4"-20 stainless steel bolts anchored securely by means of toggles or expansion shields.
12. Sinks:
- a. All sinks shall be the size and shape as shown on drawings, and constructed of #14 gauge stainless steel with backs, bottoms and fronts formed of one continuous sheet and the ends welded in place.
 - b. Sinks shall have all corners, both vertical and horizontal, coved on a 3/4" radius electrically welded, ground smooth and polished. Solder in filleted corners will not be acceptable.
 - c. Multiple compartment sinks shall be divided with double wall, #14 gauge stainless steel partitions with a 1/2" radius on top and all corners rounded as other corners, continuously welded, ground smooth and polished.
 - d. The bottom of each compartment shall be creased to a die stamped recess, tapered and shaped to receive a lever type waste without the use of solder, rivets, or welding.
 - e. Provide #14 gauge stainless steel waste lever angle bracket mounted to underside of compartment at front.
 - f. The front and exposed ends of sinks shall be fabricated with a 1-1/2", 180 degree rolled edge. The back and ends adjacent to walls or other fixtures shall be turned up with integral coved edge 12" high and returned 2-1/2" at the top on a 45° angle. Cap ends of all exposed splashes.
 - g. Unless otherwise specified, two (2) faucet holes on 8" centers shall be provided, located over the centerline of partitions between compartments, 2-1/2" down from splash break.
 - h. Gussets for legs shall be fully welded all around to #12 gauge stainless steel triangular plates fully welded to underside of sink.
 - i. Sinks fabricated into working surfaces shall be constructed of the same material and in like manner to sinks specified above, except rolled edge and backsplash shall be omitted and the bowl shall be completely welded integral and flush with the working surface. Where basket type wastes are called for, they shall be fitted with removable seats.
 - j. Where sink bowls are exposed, the exterior shall also be polished to a #4 finish.
13. Sink Drainboards:
- a. Drainboards shall be constructed of the same material as the sinks and shall be welded integral to same.
 - b. The front portion of drainboards shall continue the 1-1/2", 180° rolled edge of sink bowls on a continuous and level horizontal plane.
 - c. The surface of the drainboard shall pitch from 2-1/2" at the end furthest from the sink, to 3" at the bowl; or 1/8" per foot. In addition, the bottom surface shall be dished toward the center for complete drainage.
 - d. The backsplash of the drainboard shall match the rear of the sink contour and shall be welded integral thereto, running parallel to the floor.
 - e. Drainboards shall be reinforced on the underside with a framework of 1"x4"x1" stainless steel channel underbracing placed at each pair of legs, with exposed ends capped, and one (1) channel running lengthwise.
 - f. Where disposer cones are fabricated into drainboards, additional 1"x4"x1" stainless steel channels shall be welded into the top framing, spanning the drainboard from front-to-back on both sides of the cone and located not more than 3" to either side.
 - g. Disposer control panels or switches shall be supported beneath drainboards, when specified, by means of a #12 gauge stainless steel mounting bracket.
14. Dishable Tops:
- a. Dishables shall be constructed of #14 gauge stainless steel with all corners, both vertical and horizontal, coved on a 3/4" radius electrically welded, ground smooth and polished. Solder in filleted corners will not be acceptable.

- b. Fronts and exposed ends shall be fabricated with a 3" high, 1-1/2", 180° rolled edge with rounded corners. The back and ends adjacent to walls or other fixtures shall be turned up with integral coved edge 12" high and returned 2-1/2" at the top on a 45° angle. Cap ends of all exposed splashes.
 - c. All tops shall slope 1/8" per foot (minimum).
 - d. Dishtables shall be reinforced on the underside with a framework of 1"x4"x1" stainless steel channel underbracing placed at each pair of legs, with exposed ends capped, and one (1) channel running lengthwise fully welded between front-to-back channels.
 - e. Where tops fit into dishmachines, they shall turn down and into, forming a sealed watertight fit, and attached according to dishmachine manufacturers instructions.
 - f. On each side of dishmachine, tables shall be provided with integral splash shields as part of the backsplash.
 - g. Silicon filling of gaps caused by poor fit will not be acceptable.
 - h. On corner-type door machines, provide #14 gauge stainless steel wall-mounted, splash panel to protect adjacent wall, full width of door opening.
15. Cafeteria Style Counters:
- a. All counters shall be constructed as previously specified under Enclosed Bases.
 - b. Provide top and bottom framing for each counter food pan, cold pan, coffee urn, ice cream unit, ice bin, dish dispenser, etc., whether a drop-in unit or a cutout for a portable unit.
 - c. Where plate shelves occur, frame horizontally 8-1/2" back from counter edge or as design dictates, and at bottom of shelf at counteredge.
 - d. The countertop shall be constructed of #14 gauge stainless steel, as previously specified, with all joints welded, ground and polished.
 - e. Fronts and exposed ends shall be stainless steel, plastic laminate or other material as noted in the Item Specifications.
 - f. All display glass shelving shall be 1/4" polished plate glass and fully trimmed with #18 gauge stainless steel formed channels. Top shelves shall be the same width as the shelf below. Shelves shall be supported on 5/8" square, #16 gauge stainless steel perimeter tubing fully welded to 1-1/4" square, #16 gauge stainless steel tubing uprights.
 - g. Provide appropriate adjustable glass sneeze or breath guards trimmed in stainless steel along front, entire length, mounted in Klein 4465-A brackets.
 - h. Protector shelf over hot food wells shall be #16 gauge stainless steel supported on 1-1/4" square, #16 gauge stainless steel tubing uprights, with 1/4" polished plate glass front and end panels trimmed in #18 gauge stainless steel channels. When specified for self-service, mount bottom edge of front panel 8" above countertop.
 - i. All display and protector shelves shall be furnished with full-length fluorescent lights wired to on/off switch in counter apron, with lamps and protective shields. Conceal all wiring in tubular uprights.
 - j. Refer to Item Specification for changes, as required.
 - k. Counter shall be internally wired complete by the K.E.C., and in such a way as to meet the requirements of the Electrical Code of the job location.

2.4 EQUIPMENT

- A. All items listed on the Contract Documents under the heading "Equipment Schedule" shall be furnished in strict accordance with the foregoing specifications and with the following detailed Itemized Specifications.
- B. Manufacturer's names and model numbers are shown establishing quality, size, and finish required, representing the Owner's and Consultant's requirements and basis for bid. Equipment is listed hereinafter with same item numbers as shown on Contract Documents.

PART 3 EXECUTION

3.1 INSPECTION

- A. Before beginning the installation of foodservice equipment, the spaces and existing conditions shall be examined by the K.E.C. and any deficiencies, discrepancies, or unsatisfactory conditions for proper installation of foodservice equipment shall be reported to the Architect in writing.
 - 1. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner satisfactory to the installer.
 - 2. Beginning installation shall constitute acceptance of the area.

3.2 PREPARATION

- A. Foodservice equipment drawings are diagrammatic and intended to show layout, arrangement, mechanical and electrical requirements.
- B. Field verify all measurements at the building prior to fabrication of custom equipment. Coordinate measurements and dimensions with rough-in and space requirements.

3.3 INSTALLATION

- A. The K.E.C. shall coordinate his delivery schedule with the General Contractor to ensure adequate openings in the building to receive the equipment.
- B. Equipment shall be un-crated, fully assembled and set level in position for final connections. Parts shipped loose but required for connection shall be properly tagged and shall be accompanied by the necessary installation instructions.
- C. Provide a competent, experienced foreman to supervise installation and final connections with other trades.
- D. Remote Refrigeration Systems:
 - 1. All refrigeration work where applicable to this contract shall be accomplished in an approved manner, using finest quality fittings, controls, valves, etc.
 - 2. Refrigeration items shall be started up, tested, adjusted, and turned over to the Owner in first class condition and left running in accordance with the manufacturer's instructions.
 - 3. Refrigeration lines and hook-ups shall be completed by the K.E.C. with the exception of electric, water, and drain line final connections unless otherwise specified.
 - 4. All copper tubing shall be refrigerant grade A.C.R. or type "L".
 - 5. Silver solder and/or Sil-Fos shall be used for all refrigerant piping. Soft solder is not acceptable.
 - 6. All refrigerant lines in pipe sleeves or conduit shall be effectively caulked at ends to prevent entrance of water or vermin and at penetrations through walls or floors.
 - 7. All tubing shall be securely anchored with clamps, and suspended lines shall be supported with adjustable hangers at 6'-0" o.c. maximum.
 - 8. Wrap drain line in freezer compartment(s) with approved heat-tape for final connection by Electrical Contractor.
- E. Sealing and Caulking:
 - 1. Prior to the application of sealant, all surfaces shall be thoroughly cleaned and de-greased.
 - 2. Apply around each unit of permanent installation at all intersections with walls, floors, curbs or other permanent items of equipment.
 - 3. Joints shall be air-tight, water-tight, vermin-proof, and sanitary for cleaning purposes.
 - 4. In general, joints shall be not less than 1/8" wide, with backer rod to shape sealant bead properly at 1/4" depth. Shape exposed surfaces of sealant slightly concave, with edges flush with faces of materials at joint.
 - 5. At internal corner joints, apply sealant or gaskets to form a sanitary cove, of not less than

- 3/8" radius.
6. Provide sealant-filled joints up to 3/4" in joint width. Trim strips for wider joints shall be set in a bed of sealant and attached with stainless steel fasteners, 48" o.c., or less, to insure suitable fastening and prevent buckling of the metals fastened.
- F. Cutting:
1. All cutting, fitting, or patching required during installation shall be accomplished by the K.E.C., at his own expense, so as to make the work conform to the plans and specifications.
 2. The K.E.C. shall not cut or otherwise alter, except with the consent of the Owner, the work of any other Contractor.
 3. Provide cut-outs in foodservice equipment where required to run plumbing, electric, or steam lines through equipment items for final connections.

3.4 FIELD QUALITY CONTROL

- A. Inspection:
1. Provide access to shop fabrication areas during normal working hours to facilitate inspection of the equipment, during construction, by the Architect or his authorized representative.
 2. Errors found during these inspections shall be corrected to the extent required within the scope of the plans, specifications, and approved drawings.
- B. Start-Up and Testing:
1. Delay start-up of foodservice equipment until service lines have been tested, balanced, and adjusted for pressure, voltage, and similar considerations; and until water and steam lines have been cleaned and treated for sanitation.
 2. Before testing, lubricate each equipment item in accordance with manufacturer's recommendations.
 3. Supply a trained person or persons who shall start up all equipment, test and make adjustments as necessary, resulting in each item of equipment, including controls and safety devices, performing in accordance with the manufacturer's specifications.
 4. All gas-fired equipment shall be checked by the local gas company as to calibration, air adjustments, etc., and adjustments made as required.
 5. Repair or replace any equipment found to be defective in its operation, including items which are below capacity or operating with excessive noise or vibration.
- C. Demonstration:
1. Provide an operating demonstration of all equipment at a time of Owner's convenience, to be held in the presence of authorized representatives of the Architect and Owner.
 2. Provide a follow-up kitchen demonstration three (3) months after the initial demonstration or kitchen opening. K.E.C. to coordinate scheduling with manufacturer's representatives.
 3. Demonstration shall be performed by manufacturer's representative knowledgeable in all aspects of his equipment.
 4. During the demonstration, instruct the Owner's operating personnel in the proper operation and maintenance of the equipment.
 5. Furnish complete, bound, operation/maintenance manuals and certificates of warranty for all items of equipment provided, in accordance with Article 1.5 Submittals, Paragraph F, at this demonstration time.

3.5 ADJUST AND CLEAN

- A. Upon completion of installation and tests, clean and sanitize foodservice equipment, and leave in condition ready for use in food service.
- B. Remove all protective coverings, and thoroughly clean equipment both internally and externally with stainless steel cleaner.

- C. Make and check final adjustments required for proper operation of the equipment.
- D. Restore finishes marred during installation to remove abrasions, dents, and other damages. Polish stainless steel surfaces, and touch-up painted surfaces with original paint.
- E. Clean up all refuse, rubbish, scrap materials, and debris caused by the work of this Section, and put the site in a neat, orderly, and broom-clean condition.

3.6 ITEMIZED SPECIFICATIONS

ITEM #1: SHELVING

QUANTITY: One (1)
 MANUFACTURER: InterMetro Industries Corporation
 MODEL NO.: MetroMax Q™ (N058)
 PERTINENT DATA: Four-Tier High, Stationary, Free-Standing, Open-Shelf Mat, Polymer
 UTILITIES REQ'D: ----
 ALTERNATE MFR.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

Custodial:

1. One (1) #MQ1836G section; 18" W x 36" L x 4-tier high.
2. Four (4) #MX63PE epoxy coated steel posts; 62-3/16" high.
3. Plastic split sleeves, quantity as required.
4. Locate bottom shelf @ 12" A.F.F.; space remaining shelves equally.

ITEM #2: WASHER/DRYER, STACKED

QUANTITY: One (1)
 MANUFACTURER: Huebsch
 MODEL NO.: YTEE5ASP173TW01/YTEE5ASP183TW01 (N058)
 PERTINENT DATA: Commercial Heavy-Duty, 3.42 Cu. Ft. Capacity Washer Tub, 7.0 Cu. Ft. Capacity Dryer
 UTILITIES REQ'D: 15.0A, 120V, 1PH (Washer), 30.0A, 120/208V, 1PH (Dryer); 1/2" HW, 1/2" CW, 3" IW
 ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Cord and plug set with matching receptacle furnished and installed by Electrical Contractor.

ITEM #3: MOP SINK & RACK

QUANTITY: One (1)
MANUFACTURER: IMC Teddy Foodservice Equipment
MODEL NO.: FS-L(N058)
PERTINENT DATA: Left Corner, Floor Mounted
UTILITIES REQ'D: 1/2" HW, 1/2" CW, 4" W
ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Accessories:
 - One (1) #HA hose assembly, 36" long.
 - One (1) #SSF service sink wall faucet.
 - One (1) #MH mop holder with four (4) individual rubber holders.
2. Furnish 16 gauge stainless steel flashing along two (2) walls adjacent sink, 36" high. Attach to wall with non-exposed fasteners and seal to wall and sink.

ITEM #4: UTILITY CART, MOBILE

QUANTITY: Four (4)
MANUFACTURER: Steril-Sil Company
MODEL NO.: UTC-303 (N058)
PERTINENT DATA: Heavy-Duty, Stainless Steel, 1,000-lb. Capacity, Three-Shelf, NSF Model
UTILITIES REQ'D: ----
ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Fixed front casters, swivel and locking rear casters and bumpers.

ITEM #5: POT & PAN SHELVING, MOBILE

QUANTITY: Two (2)
MANUFACTURER: InterMetro Industries Corporation
MODEL NO.: MetroMax i® (N058)
PERTINENT DATA: Four-Tier High, 24" Wide, Open-Shelf Mat, Polymer
UTILITIES REQ'D: ----
ALTERNATE MFR.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Two (2) #MX2448G sections; 24" W x 48" L x 4-tier high.
2. Eight (8) #MX63UP polymer posts, 61-3/16" high.
3. Four (4) #5MPX polyurethane swivel casters with bumpers.

ITEM #5: (Continued)

4. Four (4) #5MPBX polyurethane swivel casters with brakes and bumpers.
5. Plastic wedge lock connectors, quantity as required.
6. Locate bottom shelf @ 12" A.F.F.; space remaining shelves equally.
7. Accessories: (for each unit)
 - One (1) #XTR2448XE tray drying rack.
 - Five (5) #MXD24-8 shelf dividers.

ITEM #6: DUNNAGE RACK

QUANTITY: One (1)
 MANUFACTURER: InterMetro Industries Corporation
 MODEL NO.: MetroMax i (N058)
 PERTINENT DATA: Stationary, With Open-Grid Shelf, Polymer, Heavy-Duty Assembly
 UTILITIES REQ'D: ----
 ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

Dry Storage:

1. One (1) #MHP2448G shelf unit; 24"W x 48"L.
2. Four (4) #MX13P polymer posts, 13" high.
3. One (1) #M3TF2448E structural steel tubing 3-sided frame.

ITEM #7: SHELVING, MOBILE

QUANTITY: Thirteen (13)
 MANUFACTURER: InterMetro Industries Corporation
 MODEL NO.: MetroMax Q (N058)
 PERTINENT DATA: Five-Tier High, Open-Grid Shelf Mat
 UTILITIES REQ'D: ----
 ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

Dry Storage:

1. Twelve (12) #MQ2448G sections; 24" W x 48" L x 5-tier high.
2. One (1) #MQ2454G section; 24" W x 54" L x 5-tier high.

ITEM #7: (Continued)

3. Fifty-two (52) #MQ74UPE posts for stem casters, 74-3/16" high.
4. Twenty-six (26) #5MPX polyurethane swivel casters with bumpers.
5. Twenty-six (26) #5MPBX polyurethane swivel casters with brakes and bumpers.
6. Locate bottom shelf @ 10" A.F.F., space remaining shelves equally.

ITEM #8: HAND SINK

QUANTITY: Seven (7)
 MANUFACTURER: Eagle Foodservice Equipment Company
 MODEL NO.: HSA-10-FAW-LRS (N058)
 PERTINENT DATA: Wall Mounted Assembly, With Wrist Handles and Eye Wash Accessory
 UTILITIES REQ'D: 1/2" HW, 1/2" CW, 1-1/2" W
 ALTERNATE MFRS.: Advance Tabco; John Boos

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Complete sink assembly consisting of gooseneck faucet with wrist handles, p-trap, tailpiece and basket drain.
2. Accessories:
 - #606215 skirt assemblies.
 - Left and right end splashes.
 - One (1) #326272 faucet mount emergency eye wash unit.

ITEM #9: SOAP & TOWEL DISPENSER-- (N.I.K.E.C. - SPECIFIED BY ARCHITECT)

QUANTITY: Seven (7)

ITEM #10: POT WASHING SINK

QUANTITY: One (1)
 MANUFACTURER: Custom Fabricated
 MODEL NO.: #14 GA Stainless Steel
 PERTINENT DATA: 15'-0" Long x 2'-6" Wide x 2'-10" High
 UTILITIES REQ'D: (2) 3/4" HW, (2) 3/4" CW, (3) 2" IW
 ALTERNATE MFRS.: None

Fabricate and set-in-place per Equipment Plan, Sheet K-101; Fabrication Detail, Sheet K-501 and the following:

1. Front and end edge rolls per Detail 1.02B.

ITEM #10: (Continued)

2. 13" high back splash per Detail 1.04A.
3. Framework per Detail 1.05.
4. Legs per Detail 1.07.
5. Crossbracing per Detail 1.10.
6. Stainless steel undershelf on right end per Detail 1.11.
7. Two (2) stainless steel overshelves per Detail 1.12.
8. Pot sink and drainboards per Detail 3.01.
9. Sound-deaden underside of sinks and drainboards with NSF-approved sound dampening material.
10. Accessories:
 - One (1) T&S #B-0290 backsplash mounted swing spout faucet.
 - One (1) T&S #B-0133 splash-mounted pre-rinse spray with add-on faucet, built-in backflow preventer and wall bracket.
 - Three (3) T&S #B-3950-01 twist waste valves with overflow assemblies and #010387-45 basket strainers.
 - 18" high #20-gauge stainless steel, full length wall-flashing above backsplash.
11. Item will remain shrink-wrapped until ready for final connection by Contractor. Immediately following completion of final connections, K.E.C. shall re-shrink-wrap tubs or provide removable panel to avoid use by construction trades. Post sign on wall above sink tubs in English and Spanish stating: **WARNING! NOT TO BE USED BY CONSTRUCTION TRADES. FAILURE TO COMPLY WILL RESULT IN \$500.00 FINE AND ALL COSTS TO REPLACE ITEM WITH NEW.**

ITEM #11: REACH-IN REFRIGERATOR, MOBILE

QUANTITY: Two (2)
 MANUFACTURER: Continental Refrigerator
 MODEL NO.: D2RN-SS-HD (N058)
 PERTINENT DATA: Two-Section, Self-Contained, Stainless Steel Exterior/Interior
 UTILITIES REQ'D: 6.9A, 120V, 1PH
 ALTERNATE MFRS.: Traulsen, Victory

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Half-height doors hinged per Equipment Plan.
2. Cylinder door locks, keyed-alike.
3. Interior fitted with standard wire shelves, three (3) per compartment, twelve (12) total.
4. Exterior mounted digital thermometer.

ITEM #11: (Continued)

5. 5" diameter heavy-duty swivel casters, front two (2) with brakes.
6. Cord and plug set.

ITEM #12: WORKTABLE

QUANTITY: Two (2)
 MANUFACTURER: Custom Fabricated
 MODEL NO.: #14 GA Stainless Steel
 PERTINENT DATA: 9'-0" Long x 2'-6" Wide x 3'-0" High
 UTILITIES REQ'D: ----
 ALTERNATE MFRS.: None

Fabricate and set-in-place per Equipment Plan, Sheet K-101; Fabrication Detail, Sheet K-501 and the following:

1. Perimeter edge roll per Detail 1.02M.
2. Framework per Detail 1.05.
3. Legs per Detail 1.07.
4. Full-length stainless steel undershelf per Detail 1.11.
5. Two (2) stainless steel drawer assemblies per Detail 1.14, Type I, with locks.
6. Worktable per Detail 2.01.
7. Sound-deaden underside of worktable with NSF-approved sound dampening material.
8. Where units are side by side or back to back, join with interlocking, spring-loaded mechanism. Refer to Equipment Plan for locations.

ITEM #12A: WORKTABLE

QUANTITY: One (1)
 MANUFACTURER: Custom Fabricated
 MODEL NO.: #14 GA Stainless Steel
 PERTINENT DATA: 6'-6" Long x 2'-6" Wide x 3'-0" High
 UTILITIES REQ'D: ----
 ALTERNATE MFRS.: None

Fabricate and set-in-place per Equipment Plan, Sheet K-101; Fabrication Detail, Sheet K-501 and the following:

1. Front and left end edge roll per Detail 1.02M.

ITEM #12A: (Continued)

2. 6" high back and right end splash per Detail 1.04A.
3. Framework per Detail 1.05.
4. Legs per Detail 1.07.
5. Stainless steel undershelf per Detail 1.11.
6. Two (2) stainless steel drawer assemblies per Detail 1.14, Type I, with locks.
7. Worktable per Detail 2.01.
8. Sound-deaden underside of tabletop with NSF-approved sound dampening material.

ITEM #13: PAN RACK CART, MOBILE

QUANTITY: Four (4)
 MANUFACTURER: Cres Cor
 MODEL NO.: 273-65-12/1818 (N058)
 PERTINENT DATA: Angle Ledge, Aluminum Construction, (18) 18"x26" or 12"x20" Pan Capacity
 UTILITIES REQ'D: ----
 ALTERNATE MFR.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101, Manufacturer's Instructions and the following:

1. Accessories:
 - Full perimeter non-marking wrap-around vinyl bumper.

ITEM #14: WALK-IN COOLER/FREEZER

QUANTITY: One (1)
 MANUFACTURER: Thermo-Kool
 MODEL NO.: Indoor Installation (N058)
 PERTINENT DATA: 4" Foamed-In-Place Urethane Panels - Class I, NSF Construction
 UTILITIES REQ'D: 1500W, 120V, 1PH; 3/4" IW
 ALTERNATE MFRS.: Kolpak, Thermal Rite, Bally

Furnish and install per Equipment Plan, Sheet K-101; Building Conditions Plan, Sheet K-102; Manufacturer's Shop Drawing and the following:

1. Two Section Unit; 29'-9 1/2" L x 10'-7-1/2" D x 8'-6" H. Interior width - Cooler: 9'-0"; Freezer: 19'-6".
2. Exterior Finish:
 - 26 GA stucco embossed galvanized where unexposed.
 - 22 GA stucco embossed stainless steel where exposed.

ITEM #14: (Continued)

3. Interior Finish:
 - White .040 stucco embossed aluminum walls.
 - White acrylic enamel baked-on 26 GA smooth galvanized steel ceiling.
4. Interior Floor:
 - 4" prefabricated floor panels installed in 6" deep floor recess over hot asphalt paper or 10 MIL polyethylene sheets on building floor slab per Detail, Sheet K-102.
 - 2" setting bed with two (2) layers of wire reinforcing mesh fabric and quarry tile floor material with 6" high integral coved base, interior and exterior of box, installed over prefabricated floor panel by Flooring Contractor.
5. Entrance Door:
 - Two (2) flush-mounted, self-closing doors with 34"x78" net opening, hinged per Equipment Plan, Sheet K-101.
 - Brushed chrome camlift hinges with lift-off capability. Provide one (1) extra hinge per door, three (3) total.
 - Kason #1236 brushed chrome lever-action handle with knob-turn release and cylinder lock, each door.
 - Kason #09440004 brushed chrome dead-bolt lock, factory mounted.
 - Kason #109400003 hydraulic door closer.
 - Standard 2" diameter dial indicating thermometer factory mounted in door frame, each compartment. Probe wires to be secured in wall with cable holders and stainless steel fasteners at 18" on center.
 - Foot treadle door opener.
 - Undercut doors for quarry tile floor.
 - 36" high aluminum diamond tread kickplates, interior and exterior, of door, frame and jambs.
 - 14" x 24" heated observation windows, both doors.
 - Kason #907 interior door handle, factory mounted with concealed metal backing plate.
 - Round vinyl door bumper mounted to front exterior face to protect handle from puncturing wall when door in full open position.
 - Stainless steel heated threshold at each entrance door.
 - Kason #1806 LED light fixture with high-impact plastic globe factory mounted centered above door opening. Conceal conduit within header of door frame and extend to junction box mounted on top of door panel.
 - Engraved phenolic plastic compartment sign - 12" long x 2" high; white in color with 1" high blue CAPITAL letters mounted on door above observation window; (1) – FREEZER, (1) COOLER.
6. Heated pressure relief port in freezer compartment.
7. Four (4) Kason #1810L21248LB 48" long LED light fixtures with shatter-proof high impact plastic covers centrally-mounted to walk-in ceiling per Detail, Sheet K-104; three (3) for the freezer, one (1) for the cooler. Extend conduit connection up thru top. Fixtures shipped loose and mounted by K.E.C.; final connection by Electrical Contractor. K.E.C. to seal and insulate with silicone sealant all knock-outs in fixture casing to prevent moisture infiltration.
8. One (1) #TK4700 walk-in monitor system with #TK4 light control and panic button factory mounted in each door panel and inter-wired with building monitoring system, as required by Electrical Contractor. Provide engraved identification label mounted above each alarm.

ITEM #14: (Continued)

9. Provide and install trim strips of matching exterior finish between ends of walk-in panels and building walls from floor to finished ceiling. K.E.C. to verify ceiling height.
10. Provide and install closure panels of matching exterior finish between top of walk-in and finished ceiling. K.E.C. to verify ceiling height.
11. All electrical conduit shall be run concealed above walk-in ceiling per Detail, Sheet K-104.
12. Evaporator coil drain lines shall be run to floor drain with P-trap on exterior of box by K.E.C.
13. Black flexible "Armaflex" insulation applied to exposed drain lines and fittings within interior of box by K.E.C.
14. Spiral heat tape applied to drain line within interior of freezer compartment prior to application of insulation by Electrical Contractor. Drain line heating cable shall be installed for continuous 24-hour operation.
15. Coordinate location of sprinkler head drops and provide penetrations, where necessary.
16. K.E.C. to seal and insulate all openings to prevent infiltration of warm air into cooler/freezer compartments.
17. Quality Inspection Requirement:
 - Walk-In shall be completely erected at the manufacturer's facility prior to shipment and a quality control inspection performed on the assembled structure. A digital photograph of factory assembled walk-in shall be provided for the K.E.C. permanent records and included in the operation and maintenance manuals.
18. Accessories:
 - One (1) Kolpak #HAR-C2-N1 air shield with magnetic activation switch, factory mounted vertically, adjacent to the hinge side of the Walk-In Cooler door on the interior wall surface.
 - #16 ga. stainless steel hat-channel bumper rail with closed ends installed to front face of walk-in, full-length, mounted @ 36" A.F.F. Provide 1/8" diamond tread kickplates from top of finish floor coved base to bottom of bumper rail. Align bumper rail with 36" high aluminum kickplate on doors.
 - 6" high 1/8" thick aluminum cove baseboard, to be installed where panels are exposed at kitchen side, fastened with countersink screws and seal with gray-color silicone sealant to finish floor and walk-in panels.

ITEM #15: COOLER REFRIGERATION SYSTEM

QUANTITY: One (1)
 MANUFACTURER: ColdZone
 MODEL NO.: CFO130E4S-E (N058)
 PERTINENT DATA: Next-Gen Uni-Pak, Air Cooled, Outdoor Installation, Remote, With Surveillant Demand Defrost Control
 UTILITIES REQ'D: 8.7A, 208V, 3PH
 ALTERNATE MFRS.: RDT; Omni-Temp

ITEM #15: (Continued)

Furnish and install per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

1. Condensing Unit: Factory Pre-Assembled, Scroll, Medium Temperature, R-448A.
2. Mounted on building roof above walk-in cooler on roof curb. Curb with pitch-pocket furnished and installed by Contractor. Refer to mechanical roof plan for exact location.
3. Complete winterization package and condensing unit weatherproof cover.
4. Overall size: 28.25" L x 28" W x 19" H.
5. Weight: 195 lbs.
6. Evaporator Coil with High-Efficiency EC Motors: Low-Profile, End-Mount Type, Model CL6A094SDARE;1.6A, 120V, 1PH
 - System to operate at +35° F.
 - Furnished complete with thermostat, solenoid and expansion valves factory mounted ready for final connection by Refrigeration Contractor.
 - Surveillant Evaporator Controller to consist of a microprocessor driven controller that reduces the energy used by the evaporator coil in refrigerations systems through precise control of superheat, fan management and demand defrosts.
 - Furnish Cat5 cable and interwire to building monitoring system by Electrical Contractor.
7. Complete refrigeration system warrantee: five (5) years for the compressor, two (2) years for the condensing unit, and two (2) years for all parts of the evaporator coil.
8. Factory installed main-fused disconnect switch.

ITEM #16: FREEZER REFRIGERATION SYSTEM

QUANTITY: One (1)
MANUFACTURER: ColdZone
MODEL NO.: CFO400L4S-E (N058)
PERTINENT DATA: Next-Gen Uni-Pak, Air Cooled, Outdoor Installation, Remote, With Surveillant Demand Defrost Control
UTILITIES REQ'D: 16.0A, 208V, 3PH
ALTERNATE MFRS.: RDT; Omni-Temp

Furnish and install per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

1. Condensing Unit: Factory Pre-Assembled, Scroll, Low Temperature, R-448A.
2. Mounted on building roof above walk-in cooler on roof curb. Curb with pitch-pocket furnished and installed by Contractor. Refer to mechanical roof plan for exact location.
3. Complete winterization package and condensing unit weatherproof cover.
4. Overall size: 33" L x 44" W x 35" H.

ITEM #16: (Continued)

5. Weight: 352 lbs.
6. Evaporator Coil with High-Efficiency EC Motors: Low-Profile, End-Mount Type, Model CL6E105DDARE, 1.0A, 208V, 1PH (Fan); 9.8A, 208V, 1PH (Defrost Heater)
 - System to operate at -10° F.
 - Furnished complete with thermostat, solenoid and expansion valves factory mounted ready for final connection by Refrigeration Contractor.
 - Surveillant Evaporator Controller to consist of a microprocessor driven controller that reduces the energy used by the evaporator coil in refrigerations systems through precise control of superheat, fan management and demand defrosts.
 - Furnish Cat5 cable and interwire to building monitoring system by Electrical Contractor.
7. Complete refrigeration system warrantee: five (5) years for the compressor, two (2) years for the condensing unit, and two (2) years for all parts of the evaporator coil.
8. Factory installed main-fused disconnect switch.

ITEM #17: DUNNAGE RACK

QUANTITY: Two (2)
 MANUFACTURER: InterMetro Industries Corporation
 MODEL NO.: MetroMax i (N058)
 PERTINENT DATA: Stationary, With Open-Grid Shelf, Polymer, Heavy-Duty Assembly
 UTILITIES REQ'D: ----
 ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

Cooler:

1. One (1) #MHP2448G shelf unit; 24"W x 48"L.
2. Four (4) #MX13P polymer posts, 13" high.
3. One (1) #M3TF2448E structural steel tubing 3-sided frame.

Freezer:

1. One (1) #MHP2448G shelf unit; 24"W x 48"L.
2. Four (4) #MX13P polymer posts, 13" high.
3. One (1) #M3TF2448E structural steel tubing 3-sided frame.

ITEM #18: SHELVING, MOBILE

QUANTITY: Twelve (12)
MANUFACTURER: InterMetro Industries Corporation
MODEL NO.: MetroMax i (N058)
PERTINENT DATA: Open-Grid Shelf Mat, Polymer
UTILITIES REQ'D: ----
ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

Cooler:

1. One (1) #MX2436G section; 24" W x 36" L x 4-tier high.
2. One (1) #MX2448G section; 24" W x 48" L x 4-tier high.
3. One (1) #MX2460G section; 24" W x 60" L x 4-tier high.
4. Twelve (12) #MX63UP polymer posts for stem casters, 61-3/16" high.
5. Six (6) #5MPX polyurethane swivel casters with bumpers.
6. Six (6) #5MPBX polyurethane swivel casters with brakes and bumpers.
7. Plastic wedge lock connectors, quantity as required.
8. Locate bottom shelf @ 10" A.F.F.; space remaining shelves equally.

Freezer:

1. Three (3) #MX2436G sections; 24" W x 36" L x 4-tier high.
2. Two (2) #MX2448G sections; 24" W x 48" L x 4-tier high.
3. Four (4) #MX2460G sections; 24" W x 60" L x 4-tier high.
4. Thirty-six (36) #MX63UP polymer posts for stem casters, 61-3/16" high.
5. Eighteen (18) #5MPX polyurethane swivel casters with bumpers.
6. Eighteen (18) #5MPBX polyurethane swivel casters with brakes and bumpers.
7. Plastic wedge lock connectors, quantity as required.
8. Locate bottom shelf @ 10" A.F.F.; space remaining shelves equally.

ITEM #19: PREP SINK

QUANTITY: One (1)
 MANUFACTURER: Custom Fabricated
 MODEL NO.: #14 GA Stainless Steel
 PERTINENT DATA: 8'-0" Long x 2'-6" Wide x 2'-10" High
 UTILITIES REQ'D: 1/2" HW, 1/2" CW, (2)1-1/2" IW
 ALTERNATE MFRS.: None

Fabricate and set-in-place per Equipment Plan, Sheet K-101; Fabrication Detail, Sheet K-501; and the following:

1. Front and end edge rolls per Detail 1.02B.
2. 13" high back splash per Detail 1.04A.
3. Framework per Detail 1.05.
4. Legs per Detail 1.07.
5. Stainless steel undershelf on both ends per Detail 1.11.
6. 5'-0" stainless steel overshelf per Detail 1.12.
7. Sound deaden underside of sinks and drainboards with NSF-approved sound dampening material.
8. Accessories:
 - One (1) T&S #B-0231 backsplash mounted swing spout faucet with 12" nozzle and #B-0199-01 non-splash aerator.
 - Two (2) T&S #B-3950-01 twist handle drains with rear-connected over-flows, handle bracket and basket strainer.
9. Item will remain shrink-wrapped until ready for final connection by Contractor. Immediately following completion of final connections, K.E.C. shall re-shrink-wrap tubs or provide removable panel to avoid use by construction trades. Post sign on wall above sink tubs in English and Spanish stating: **WARNING! NOT TO BE USED BY CONSTRUCTION TRADES. FAILURE TO COMPLY WILL RESULT IN \$500.00 FINE AND ALL COSTS TO REPLACE ITEM WITH NEW.**

ITEM #20: WORKTABLE

QUANTITY: One (1)
 MANUFACTURER: Custom Fabricated
 MODEL NO.: #14 GA Stainless Steel
 PERTINENT DATA: 9'-0" Long x 2'-6" Wide x 3'-0" High
 UTILITIES REQ'D: ----
 ALTERNATE MFRS.: None

Fabricate and set-in-place per Equipment Plan, Sheet K-101; Fabrication Detail, Sheet K-501 and the following:

ITEM #20: (Continued)

1. Perimeter edge roll per Detail 1.02M.
2. Framework per Detail 1.05, to interlock with Item #21, Worktable with Sink.
3. Legs per Detail 1.07.
4. Full-length stainless steel undershelf per Detail 1.11.
5. Two (2) stainless steel drawer assemblies per Detail 1.14, Type I, with locks.
6. Worktable per Detail 2.01.
7. Sound-deaden underside of worktable with NSF-approved sound dampening material.

ITEM #21: WORKTABLE WITH SINK

QUANTITY: One (1)
MANUFACTURER: Custom Fabricated
MODEL NO.: #14 GA Stainless Steel
PERTINENT DATA: 9'-0" Long x 2'-6" Wide x 3'-0" High
UTILITIES REQ'D: 1/2" HW, 1/2" CW, 1-1/2" IW
ALTERNATE MFRS.: None

Fabricate and set-in-place per Equipment Plan, Sheet K-101; Fabrication Detail, Sheet K-501 and the following:

1. Front and end edge rolls per Detail 1.02B.
2. 6" high backsplash per Detail 1.04A with finished back.
3. Legs per Detail 1.07.
4. Crossbracing per Detail 1.10.
5. Stainless steel undershelf per Detail 1.11.
6. Two (2) stainless steel drawer assemblies per Detail 1.14, Type I, with locks.
7. Full-length table-mounted, single-sided utensil rack per Detail 1.18B.
8. Worktable per Detail 2.01.
9. 18" x 18" x 12" deep utility sink per Detail 3.04 with stainless steel waste lever angle brackets fully welded to underside of sink.
10. Sound-deaden underside of tabletop and sink with NSF-approved sound dampening material.

ITEM #21: (Continued)

11. Accessories:

- One (1) T&S #B-0325 deck-mounted swing spout faucet with #B-0199-02F10 aerator.
- One (1) Edlund #S-11C manual can opener mounted on end of table, as shown on plan.

ITEM #22: UTILITY RACEWAY

QUANTITY: One (1)
MANUFACTURER: Captive-Aire Systems, Inc.
MODEL NO.: UDS (N058)
PERTINENT DATA: Wall-Mounted
UTILITIES REQ'D: 50.0A, 120/208V, 3PH; 3/4"HW, 3/4"CW; 1-1/4" Natural Gas @ 840MBH
(Looped Service)
ALTERNATE MFRS.: Avtec, Gaylord

Furnish and install per Equipment Plan, Sheet K-101; Utility Raceway Details, Sheet K-502; Manufacturer's Instructions and the following:

1. All components and labor necessary for a complete system manufactured in accordance with NEC latest edition, NEMA, NFPA No. 96 and No. 54, Uniform Plumbing Code, ASME, OSHA using only U.L. Listed certified components.
2. One (1) 18'-0" long, 10" wide x 6'-10" high with risers, completely pre-wired and pre-plumbed to one final connection point for electric, hot water, cold water and gas. All connections shall face down on horizontal member.
3. System shall extend up to bottom edge of Ventilator, Item #23.
4. Raceway height per detail shown on Sheet K-502.
5. Riser size as shown on Detail, Sheet K-502.
6. Entire raceway shall be constructed of #16 gauge Type 304 stainless steel with a #4 mill finish.
7. Removable link plates constructed of #16 gauge stainless steel.
8. Electrical compartment shall be completely enclosed with stainless steel housing accessible by the removal of link plates. Internal electrical feeder shall be cable wireway having balanced load and phases and with connection lugs for main service. Branch circuit wiring for each electrical connection shall be phase identified and sized in accordance with circuit breaker rated capacity. Raceway shall provide electrical, gas and water service for items #24, #25 and #26.
9. Provide 12" long interchangeable 16 gauge stainless steel link connection plate for each electrical connection equipped with individual circuit breaker(s) installed in breaker panel mounted in left-hand riser, and grounding type receptacle with twist-lock feature or pre-wired flexible sealtite conduit.
10. On each connection plate provide U.L. listed GFIC ground fault interrupter circuits and matching power supply cords on each 120-volt single-phase connection.

ITEM #22: (Continued)

11. Hot water and cold water plumbing compartment shall be isolated from electrical compartment. All piping and disconnects in system shall be color coded.
12. At each individual gas branch connection, provide 1/4-turn ball valve and 48" long Dormont PVC coated AGA and NSF approved flexible hose with SnapFast quick-disconnect device and double SwivelMAX gas connectors.
13. Provide fire/fuel shut-off for electric equipment per NFPA No. 96. System shall require one final connection by Contractor from fire protection system.
14. All hot and cold water piping, including individual branch pipe connection, shall be hard temper type "L" copper tubing with copper sweat type solder fittings. At each individual connection, provide A.G.A approved flexible hose(s) with two wall brass and stainless steel construction with quick-disconnect fittings.
15. Provide matching cord sets for all electric equipment, six (6) total.
16. Neoprene bumper strips, full length.
17. Provide each mobile piece of equipment with an A.G.A. recognized restraining device protecting respective gas disconnect assemblies and connectors.
18. Electronic gas solenoid valve factory installed at each in-coming gas service ready for final connection per local codes by Plumbing Contractor; inter-wired by Electrical Contractor.
19. Accessories:
 - One (1) Rational #1900.1154US Water Filter Single Cartridge System factory-installed and housed within left-hand riser. Provide independent pre-piped water lines to service points for Item #25: Combi-Oven. Fabricate 14"x16" lexan viewport in riser panel to monitor pressure gauge and filter bowl.
 - Watts #LF7R dual check valve for each water drop.
20. Fabricated in two (2) sections, assembled in field to present integral one-piece appearance.
21. Main electrical shunt-type circuit breakers mounted in left-hand riser for 50A, 120/208V, 3PH service.
22. Factory System Design Verification (SDV) shall be performed after all inspections are complete. SDV report shall be available once completed.
23. Raceway shall be of same manufacturer as Ventilator, Item #23.

ITEM #23: VENTILATOR

QUANTITY: One (1)
MANUFACTURER: Captive-Aire Systems, Inc.
MODEL NO.: 6630ND-2 (N058)
PERTINENT DATA: Wall-Mounted, Captrate Solo Filter, With Fire Protection System
UTILITIES REQ'D: 2,775 CFM Exhaust, 800W, 120V, 1PH (Lights); 20A, 120V, 1PH (Fire Protection System)
ALTERNATE MFRS.: Avtec; Gaylord

Furnish and install per Equipment Plan, Sheet K-101; Ventilator Detail Drawing, Sheet K-503; Manufacturer's Instructions and the following:

1. 5'-6" Wide x 17'-0" Long x 2'-6" High, with bottom edge mounted at 6'-8" A.F.F. Length comprised of one (1) 8'-0" section on the left and one (1) 9'-0" section on the right. Entire unit constructed of 18 GA stainless steel with liquid tight all welded external continuous seams and joints per N.F.P.A. 96, U.L. and State of Maryland Codes.
2. Five (5) U.L. Listed, NSF-Approved, 12"x12" recessed LED light fixtures, three (3) equally spaced on the right section and two (2) equally spaced on the left section, pre-wired to common junction box.
3. Matching stainless steel perimeter closure panels to finished ceiling; K.E.C. to verify ceiling height.
4. Surface fire protection system nozzles and piping to be factory installed, chrome plated or stainless steel where exposed, ready for final connections by fire protection system sub-contractor.
5. Hanger rods and support system from structure above by Contractor. K.E.C. to coordinate method and location with other trades.
6. Stainless steel hanger brackets.
7. 12" wide stainless steel angle framing and closure panels to accommodate Utility Raceway, Item #22.
8. Stainless steel U.L. Classified 20" captrate solo grease filters with hook.
9. Semi-concealed stainless steel grease trough sloped to removable grease cups.
10. Factory System Design Verification shall be performed after all inspections are complete. SDV report shall be available once completed.
11. Ventilator shall be of same manufacturer as Utility Raceway, Item #22.
12. Accessories:
 - One (1) Ansul Model K01-2 hand-held fire extinguisher, 1.6 gallon, wall-mounted.
 - Field wrapper.
 - 12" wide utility cabinet mounted on right end of hood section with factory pre-piped Ansul R-102 fire suppression system and U.L. Listed pre-wired electrical package #DCV-1111 consisting of: light switches, lighted fan control switches, and internal factory wiring and components to reduce field wiring requirements.

ITEM #23: (Continued)

- Six-month and twelve-month inspections, servicing, and replacement of components of fire protection system as per NFPA-96 Latest Edition.
- Structural front panel.
- #18 gauge stainless steel wall flashing full length of hood to extend from top of finish floor coved base up to bottom edge of hood body. Attach to wall with non-exposed fasteners and seal with clear silicone sealant.

ITEM #24: CONVECTION OVEN, MOBILE

QUANTITY: Two (2)
MANUFACTURER: Blodgett Oven Company, Inc.
MODEL NO.: ZEPH-200-G-ES-DBL (N058)
PERTINENT DATA: Zephaire, Gas, Bakery-Depth, Double Deck
UTILITIES REQ'D: (2) 8.0A, 120V, 1PH; (2) 3/4" Natural Gas @ 50 MBH
ALTERNATE MFRS: Garland

Furnish and set-in-place per Equipment Plan, Sheet K-101, Manufacturer's Instructions and the following:

1. Natural gas fired, pressure regulator as required. Manifold rear gas connection of each oven compartment for single connection point ready for quick disconnect assembly.
2. Stainless steel front, sides, top and back panels.
3. Standard compliment of wire racks, five (5) per section.
4. Doors with dual pane thermal windows and interior light package.
5. Two-speed motors.
6. 6" diameter heavy-duty polyurethane swivel casters, front two (2) with brakes.
7. Cord and plug sets.
8. Mechanical and electrical services supplied through Utility Raceway, Item #22.

ITEM #25: COMBI OVEN

QUANTITY: One (1)
MANUFACTURER: Rational Cooking Systems, Inc.
MODEL NO.: SCC WE 102NG (N058)
PERTINENT DATA: Single Compartment, Full Size, Self-Contained
UTILITIES REQ'D: 3.85A, 208V, 1PH; 3/4" CW, 2" IW; 3/4" Natural Gas @ 151.5MBH
ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

ITEM #25: (Continued)

1. Three (3) years extended parts and labor warranty. All repairs to be performed by Rational factory certified service agents.
2. Accessories:
 - One (1) #60.30.331, UG II stand with support rails, top and both side panels.
 - Ten (10) #6019.1150 stainless steel 12" x 20" fry baskets.
 - Five (5) #6010.2101 stainless steel 24" x 20" wire racks.
 - Rational Certified Installation. Copy of report shall be made available to the Consultant once complete.
 - Installation kit.
 - Chef Assistance Program.
 - One (1) Rational #1900.1154US Water Filter Single Cartridge System.
 - One (1) bucket #56.00.210 cleaner tablets.
 - One (1) bucket #56.00.562 care tablets.
3. Approved backflow preventor furnished and installed by Plumbing Contractor.
4. Mechanical and electrical services supplied through Utility Raceway, Item #22.

ITEM #26: TILTING SKILLET, 30-GALLON

QUANTITY: One (1)
 MANUFACTURER: Cleveland Range, Inc.
 MODEL NO.: SGL30T1 (N058)
 PERTINENT DATA: Open Frame, Manual Hand Tilt, Stainless Steel Construction
 UTILITIES REQ'D: 1.4A, 120V, 1PH; ½" HW, ½" CW, 2" IW, ¾" Natural Gas @ 125 MBH
 ALTERNATE MFR: Groen, Southbend

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Accessories:
 - One (1) #FSSK food strainer.
 - One (1) #PCS pan carrier
 - One (1) #DPK13 double pantry faucet with swing spout and spray hose.
2. Mechanical and electrical services supplied through Utility Raceway, Item #22

ITEM #27: FLOOR TROUGH

QUANTITY: One (1)
 MANUFACTURER: IMC Teddy Foodservice Corporation
 MODEL NO.: ASFT2430-SQAS (N058)
 PERTINENT DATA: Anti-Spill, 14 GA S/S, Serrated Top, Anti-Slip Grating
 UTILITIES REQ'D: 4" W
 ALTERNATE MFRS.: Duke

ITEM #27: (Continued)

Furnish and install per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. 2'-6" long x 2'-0" wide, constructed and installed per Detail, Sheet K-102.
2. SGAS-24 anti-slip stainless steel serrated top subway style removable floor grate in equal sections, the lessor of 30 lbs. and/or 20" long.
3. Bottom of trough pitched to integral stainless steel waste cup with removable perforated stainless steel basket.
4. Top of trough installed flush with top of kitchen finished floor.
5. Unit furnished by K.E.C.; installed by Plumbing Contractor.

ITEM #28: PASS-THRU REFRIGERATOR, MOBILE

QUANTITY: Four (4)
MANUFACTURER: Continental Refrigerator
MODEL NO.: DL2R-SS-PT-HD (N058)
PERTINENT DATA: Two-Section, Self-Contained, Stainless Steel Interior/Exterior
UTILITIES REQ'D: 6.9A, 120V, 1PH
ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Half-height doors hinged per Equipment Plan, both sides. Glass doors on serving side, solid doors on kitchen side.
2. Cylinder door locks, keyed-alike.
3. Universal tray slide assembly installed on 4" centers in lieu of wire shelves, five (5) pair per compartment, ten (10) pair total, each unit.
4. Exterior mounted digital thermometer installed on kitchen side.
5. 5" diameter heavy-duty swivel casters, two (2) with brakes.
6. Cord and plug set

ITEM #29: PASS-THRU HEATED CABINET, MOBILE

QUANTITY: Four (4)
MANUFACTURER: Continental Refrigerator
MODEL NO.: DL1W-SS-PT-HD (N058)
PERTINENT DATA: One-Section, Self-Contained, Stainless Steel Interior/Exterior
UTILITIES REQ'D: 7.8A, 120/208V, 1PH
ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Half-height doors hinged per Equipment Plan, both sides. Glass doors on serving side, solid doors on kitchen side.
2. Cylinder door locks, keyed-alike.
3. Universal tray slide assembly installed on 4" centers in lieu of wire shelves, five (5) pair per compartment, ten (10) pair total, each unit.
4. Exterior mounted digital thermometer installed on kitchen side.
5. 5" diameter heavy-duty swivel casters, two (2) with brakes.
6. Cord and plug set with matching receptacle furnished and installed by Electrical Contractor.

ITEM #30: MILK COOLER, MOBILE

QUANTITY: One (1)
MANUFACTURER: Continental Refrigerator
MODEL NO.: MC5-SS-D-OOLP-MOD (N058)
PERTINENT DATA: 58" Wide, Dual Access, Forced-Air Type, 16-Case Capacity
UTILITIES REQ'D: 7.4A, 120V, 1PH
ALTERNATE MFRS.: Traulsen

Furnish and set-in-place per Equipment Plan, Sheet K-101, Manufacturer's Instructions and the following:

1. Stainless steel exterior and interior finish.
2. Cord and plug set.
3. Cylinder lid lock.
4. Swivel casters with brakes.
5. Accessories:
 - #5-222 corner bumper kit.
 - Foot pedal lock.
 - Modified low profile evaporator center down duct, factory installed.
6. Black laminate to match serving counter finish.

ITEM #31: SERVING COUNTER, MOBILE

QUANTITY: Four (4)
MANUFACTURER: Shelleysteel by The Delfield Company
MODEL NO.: Modular Stainless Steel Interlocking Sections
PERTINENT DATA: L-Shaped Configuration, #14 GA Stainless Steel Tops, With Solid Surface Tray Slide, Black Finish Laminate Front and Exposed Ends
UTILITIES REQ'D: ----
ALTERNATE MFRS.: Colorpoint by Low Temp Industries

Refer to individual counter components listed under alpha headings for specification.

ITEM #31A: SOLID TOP COUNTER, MOBILE

QUANTITY: Two (2)
MANUFACTURER: Shelleysteel by The Delfield Company
MODEL NO.: SC-28-NU-MOD (N058)
PERTINENT DATA: Open Base, 28" Long
UTILITIES REQ'D: ----
ALTERNATE MFR.: ColorPoint by Low-Temp Industries

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

1. (B) - 10" wide solid surface tray slide with stainless steel runners mounted on rigid brackets, color as selected by Architect; K.E.C. to verify.
2. (F) - Line-up interlocks for counter body and tray slide.
3. (P) - Open understorage with bottom and intermediate stainless steel shelf.
4. (V) - 5" diameter heavy-duty swivel casters, all (4) with brakes.
5. Black laminate front panels and exposed ends.

ITEM #31B: HOT FOOD COUNTER, MOBILE

QUANTITY: Four (4)
MANUFACTURER: Shelleysteel by The Delfield Company
MODEL NO.: SH-4-NU-MOD (N058)
PERTINENT DATA: Electrically Heated, Open Base, Four (4) Wells, With Drains
UTILITIES REQ'D: 40.0A, 120/208V, 1PH; 1/2" HW, 3/4" IW
ALTERNATE MFRS.: ColorPoint by Low-Temp Industries

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

ITEM #31B: (Continued)

1. (B) - 10" wide full-length solid stainless steel tray slide mounted on rigid brackets, color as selected by Architect; K.E.C. to verify.
2. (E) - 6" wide, full-length solid stainless steel fold-down work shelf on server's side.
3. (DCFSFS) - FlexiShield flexible single tier food protector with tempered glass front and end panels and radiant heat lamp and LED lights.
4. (F) - Line-up interlocks for counter body and tray slide.
5. Cord and plug set. Double cord hooks on bottom of unit.
6. (P) - Open understorage with bottom and intermediate stainless steel shelf.
7. (QQ) - Food wells with individual drains and quarter-turn ball valves manifolded to common valve assembly with master shut-off valve housed within counter base located on end with hinged stainless steel access door per Detail, Sheet K-506.
8. (V) - 5" diameter heavy-duty swivel casters, all (4) with brakes.
9. Black laminate front panels and exposed ends.
10. Accessories:
 - T&S #B-0205LN deck-mounted single pantry fill faucet with #B-0208 swivel nozzle mounted per Detail, Sheet K-103.

ITEM #31C: SOLID TOP COUNTER, MOBILE

QUANTITY: Two (2)
 MANUFACTURER: Shelleysteel by The Delfield Company
 MODEL NO.: SC-74-NU-MOD (N058)
 PERTINENT DATA: Open Base, 74" Long
 UTILITIES REQ'D: ----
 ALTERNATE MFRS.: Colorpoint by Low Temp Industries

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

1. 10" wide solid surface tray slide mounted on rigid brackets, color as selected by Architect, K.E.C. to verify.
2. (F) - Line-up interlock for counter body.
3. (V) - 5" diameter heavy-duty swivel casters, all (4) with brakes.
4. (P) - Open understorage with bottom and intermediate stainless steel shelf.
5. Cord and plug set.

ITEM #31C: (Continued)

6. Black laminate front panels and exposed ends.

ITEM #31D: FROST TOP COUNTER, MOBILE

QUANTITY: Three (3)
MANUFACTURER: Shelleysteel by The Delfield Company
MODEL NO.: SCFT-74-NU-MOD (N058)
PERTINENT DATA: Mechanically Refrigerated, Open Base
UTILITIES REQ'D: 7A, 120V, 1PH; 3/4" IW
ALTERNATE MFRS.: ColorPoint by Low-Temp Industries

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

1. (B) - 10" wide solid surface tray slide with stainless steel runners mounted on rigid brackets, color as selected by Architect, K.E.C. to verify.
2. (DCFSH) - Two-tier display case with glass shelves, adjustable glass sneezeguards and glass end panels.
3. (L) - LED light fixture with shatterproof shield.
4. (F) - Line-up interlocks for counter body and tray slide.
5. (P) - Open understorage with bottom and intermediate stainless steel shelf.
6. (V) - 5" diameter heavy-duty swivel casters, all (4) with brakes.
7. Cord and plug set. Double cord hooks on bottom of unit.
8. Provide drain line less shut-off valve. Plumber to extend copper drain line to nearest floor sink.
9. Black laminate front panels and exposed ends.

ITEM #31E: SOLID TOP COUNTER, MOBILE

QUANTITY: Two (2)
MANUFACTURER: Shelleysteel by The Delfield Company
MODEL NO.: SC-50-NU-MOD (N058)
PERTINENT DATA: Open Base, 50" Long
UTILITIES REQ'D: ----
ALTERNATE MFRS.: ColorPoint by Low-Temp Industries

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

ITEM #31E: (Continued)

1. (B) - 10" wide solid surface tray slide with stainless steel runners mounted on rigid brackets, color as selected by Architect, K.E.C. to verify.
2. (F) - Line-up interlocks for counter body and tray slide.
3. Cord and plug set. Double cord hooks on bottom of unit.
4. Provide cut-out in top for Item #32: Refrigerated Display Merchandiser. Counter base shall have isolated compressor housing with louvered stainless steel removable access panel and remote on/off compressor switch, operator's side.
5. (V) - 5" diameter heavy-duty swivel casters, all (4) with brakes.
6. Black laminate front panels and exposed ends.

ITEM #31F: CORNER SOLID TOP COUNTER, MOBILE

QUANTITY: Two (2)
 MANUFACTURER: Shelleysteel by The Delfield Company
 MODEL NO.: SC-50-NU-MOD (N058)
 PERTINENT DATA: Open Base, 50" Long
 UTILITIES REQ'D: ----
 ALTERNATE MFRS.: Colorpoint by Low Temp Industries

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

1. (B) - 10" wide solid surface tray slide with stainless steel runners mounted on rigid brackets, color as selected by Architect, K.E.C. to verify.
2. (F) - Line-up interlock for counter body and tray slide.
3. (V) - 5" diameter heavy-duty swivel casters, all (4) with brakes.
4. (P) - Open understorage with bottom and intermediate stainless steel shelf.
5. Black laminate front panels and exposed ends.

ITEM #31G: SOLID TOP COUNTER, MOBILE

QUANTITY: Two (2)
 MANUFACTURER: Shelleysteel by The Delfield Company
 MODEL NO.: SC-36-NU-MOD (N058)
 PERTINENT DATA: Open Base, 36" Long
 UTILITIES REQ'D: ----
 ALTERNATE MFRS.: Colorpoint by Low Temp Industries, Inc.; Piper Products

ITEM #31G: (Continued)

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

1. (B) - 10" wide solid surface tray slide with stainless steel runners mounted on rigid brackets, color as selected by Architect, K.E.C. to verify.
2. (F) - Line-up interlock for counter body and tray slide.
3. (V) - 5" diameter heavy-duty swivel casters, all (4) with brakes.
4. (P) - Open understorage with bottom and intermediate stainless steel shelf.
5. Black laminate front panels and exposed ends.

ITEM #31H: CASHIER'S STAND, MOBILE

QUANTITY: Two (2)
MANUFACTURER: Shelleysteel by The Delfield Company
MODEL NO.: SCS-30-NU-MOD (N058)
PERTINENT DATA: Open Base, 30" Long
UTILITIES REQ'D: 15A, 120V, 1PH (Dedicated Circuit)
ALTERNATE MFR.: ColorPoint by Low-Temp Industries

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Shop Drawing and the following:

1. (B) - 10" wide solid surface tray slide with stainless steel runners mounted on rigid brackets, color as selected by Architect, K.E.C. to verify.
2. (F) - Line-up interlocks for counter body and tray slide.
3. (Q) -15-amp convenience outlet mounted below top in counter body. Provide die-raised opening in top for power cord access.
4. Cashier's utility drawer with locking provision mounted on end.
5. Cord and plug set. Double cord hooks on bottom of unit.
6. Standard counter working height of 36" A.F.F.
7. (V) - 5" diameter heavy-duty swivel casters, all (4) with brakes.
8. Black laminate front panels and exposed ends.

ITEM #32: AIR MERCHANDISER

QUANTITY: Two (2)
MANUFACTURER: Structural Concepts
MODEL NO.: NE4827RSSV (N058)
PERTINENT DATA: 48" Long, Slide-in Base, Self-Contained, Self-Service, With Hinged Rear Access
Doors
UTILITIES REQ'D: 16A, 120V, 1PH; 1" IW
ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions, and the following:

1. Accessories:
 - LED top and shelf lights.
 - Rear door lock.
 - Locking security cover.
 - 5-year compressor warranty.
2. Cord and plug set.
3. Mount securely to serving counters.

ITEM #33: CASH REGISTER -- (N.I.C. - FURNISHED BY OWNER)

QUANTITY: Two (2)

ITEM #34: MILK COOLER, MOBILE

QUANTITY: Two (2)
MANUFACTURER: Continental Refrigerator
MODEL NO.: MC4-SS-D-OOLP-MOD (N058)
PERTINENT DATA: 49" Wide, Dual-Access, Forced-Air Type, 12-Case Capacity
UTILITIES REQ'D: 7.4A, 120V, 1PH
ALTERNATE MFRS.: Traulsen

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Stainless steel exterior and interior finish.
2. Cord and plug set.
3. Cylinder lid lock.
4. Swivel casters with brakes.
5. Accessories:
 - #00C01-012A-01 corner bumper kit.
 - Foot pedal lock.

ITEM #34: (Continued)

- Modified low profile evaporator center down duct, factory installed.
- 6. Black laminate to match serving counter finish.

ITEM #35: UNDERCOUNTER DISHWASHER -- (N.I.C. - FURNISHED BY OWNER)

QUANTITY: Two (2)

ITEM #36: RAILING

QUANTITY: Four (4)
MANUFACTURER: Custom Fabricated
MODEL NO.: #16 GA Stainless Steel(N058)
PERTINENT DATA: 42" L x 36" H, Double Horizontal Type2" O.D., # 16GA S/S,
UTILITIES REQ'D: ----
ALTERNATE MFRS.: None

Furnish and set-in-place per Equipment Plan, Sheet K-101; Manufacturer's Instructions and the following:

1. Units installed per Detail, Sheet K-102.
2. 6" radius on ends.
3. Cored fastened uprights with #14GA stainless steel mounting plate.

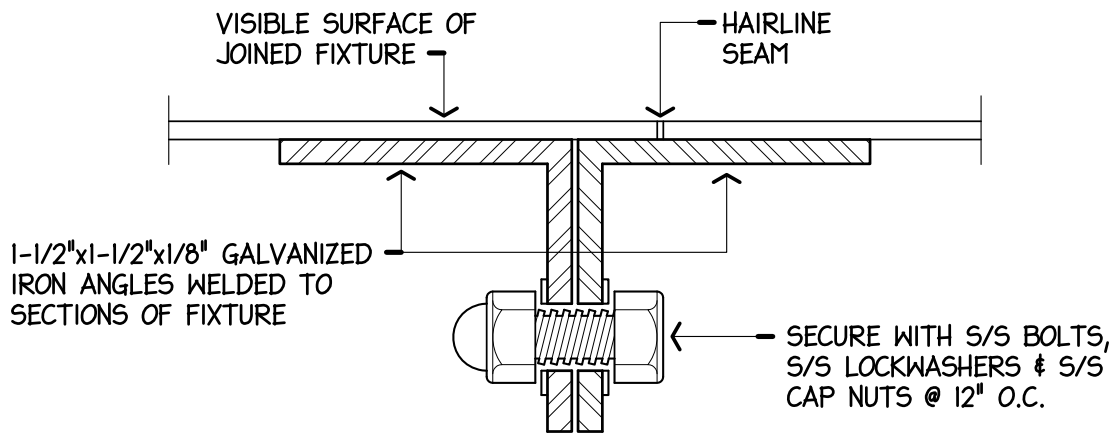
ITEM #37: CAN RACK, MOBILE

QUANTITY: Two (2)
MANUFACTURER: New Age Industrial Corp., Inc.
MODEL NO.: 97294CK (N058)
PERTINENT DATA: First In, First Out, All Welded Alloy Construction, (156) #10 Can Capacity
UTILITIES REQ'D: ----
ALTERNATE MFRS.: Win-Holt; Channel

Furnish and set-in-place per Equipment Plan, Sheet K-101 and Manufacturer's Instructions.

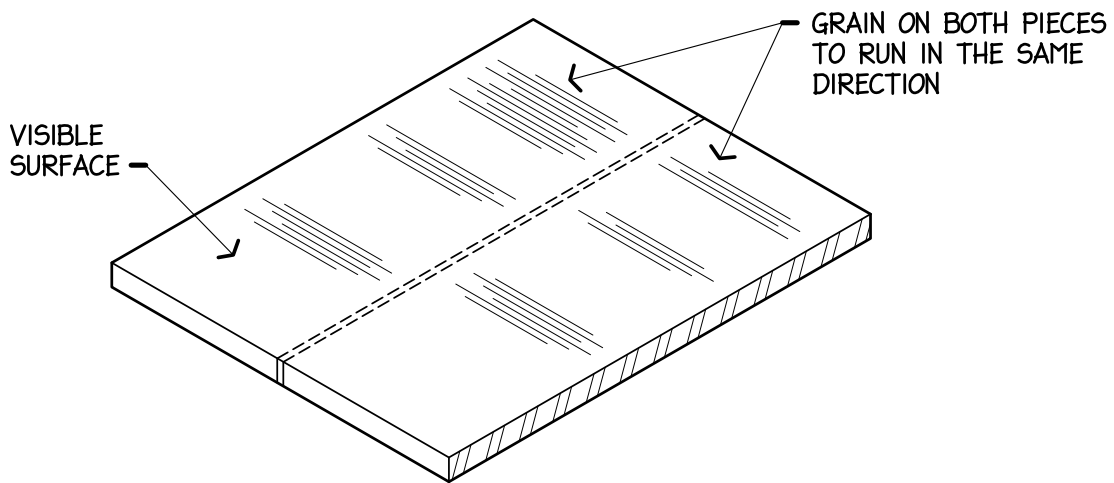
(END OF FOODSERVICE ITEMIZED SPECIFICATIONS)

STANDARD DETAILS



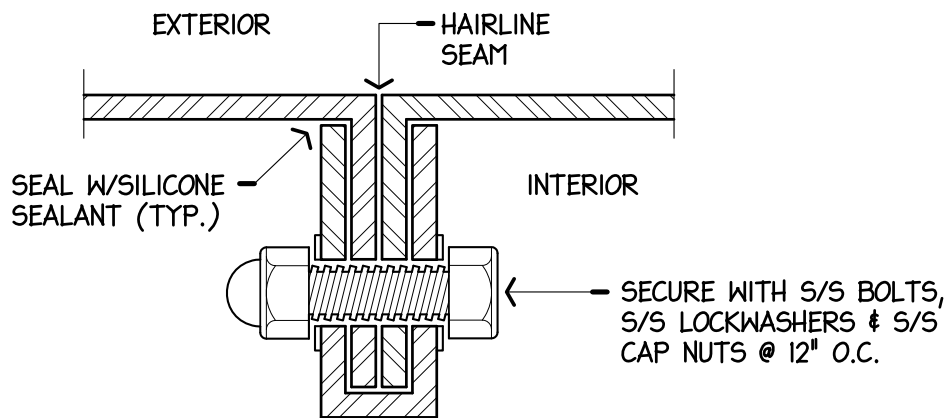
NOTE! JOINED SECTIONS SHALL BE DRAWN TOGETHER LEAVING ONLY A HAIRLINE SEAM.

A. BOLT DRAWN JOINT




NOTE! ON FIXTURES SPECIFIED WITH WELDED FIELD JOINTS, WELDS SHALL BE CONTINUOUS, GROUND & POLISHED LEAVING NO VISIBLE EVIDENCE OF WELD.

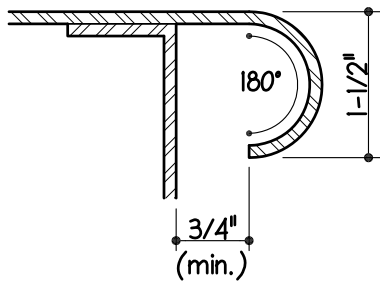
B. WELDED BUTT JOINT



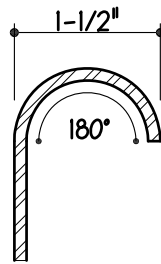
NOTE! JOINED SECTIONS SHALL BE DRAWN TOGETHER LEAVING ONLY A HAIRLINE SEAM.

C. RAISED CAP SEAM - KNUCKLE JOINT

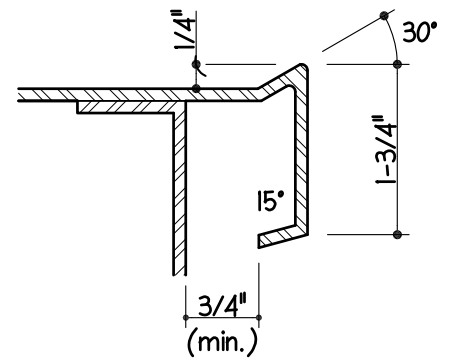
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	FIELD JOINTS & ASSEMBLY	1.01
		PAGE:
		114000-52



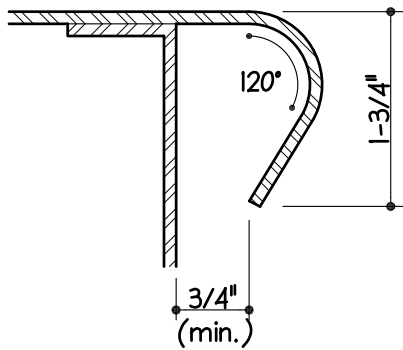
ROLLED A.



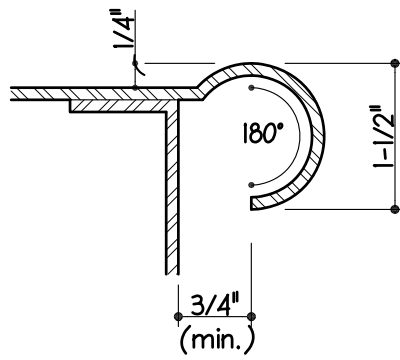
RAISED ROLLED B.



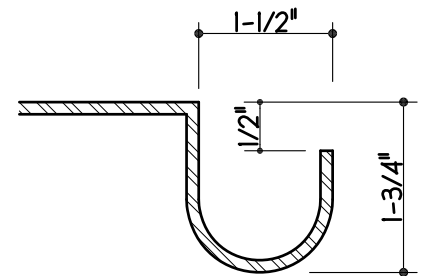
INVERTED "V" EDGE C.



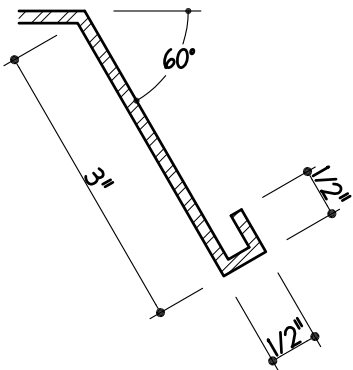
BULL NOSE ROLLED D.



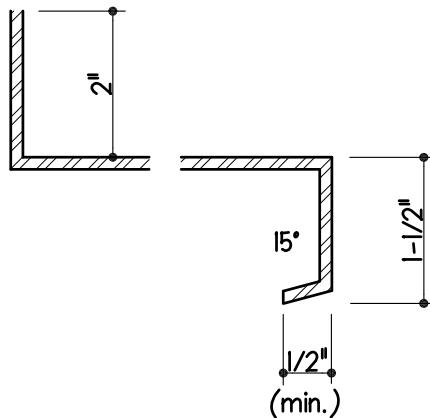
MARINE EDGE E.



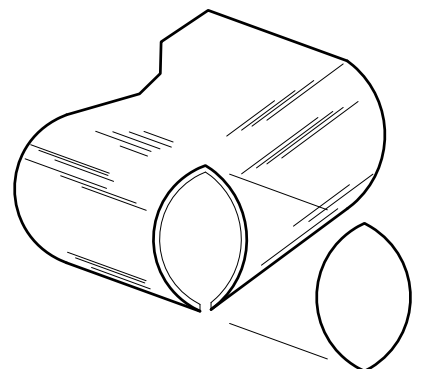
FLOUR GUTTER F.



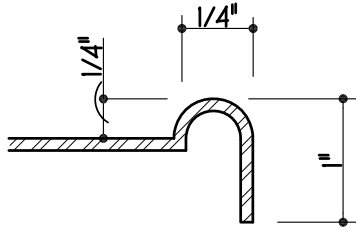
RECIPE CARD HOLDER G.



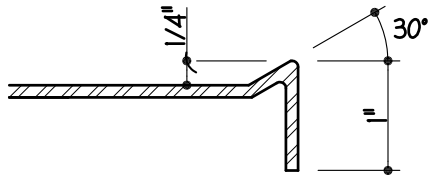
UNDERSHELF EDGE H.



BULL NOSE CORNER I.

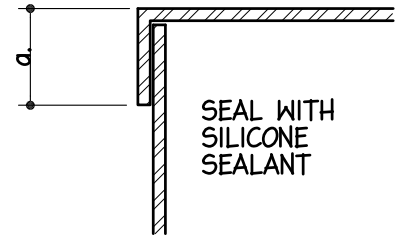


RAISED OPENING EDGE J.

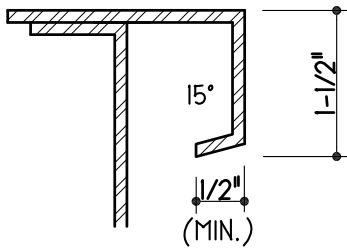


RAISED OPENING EDGE K.

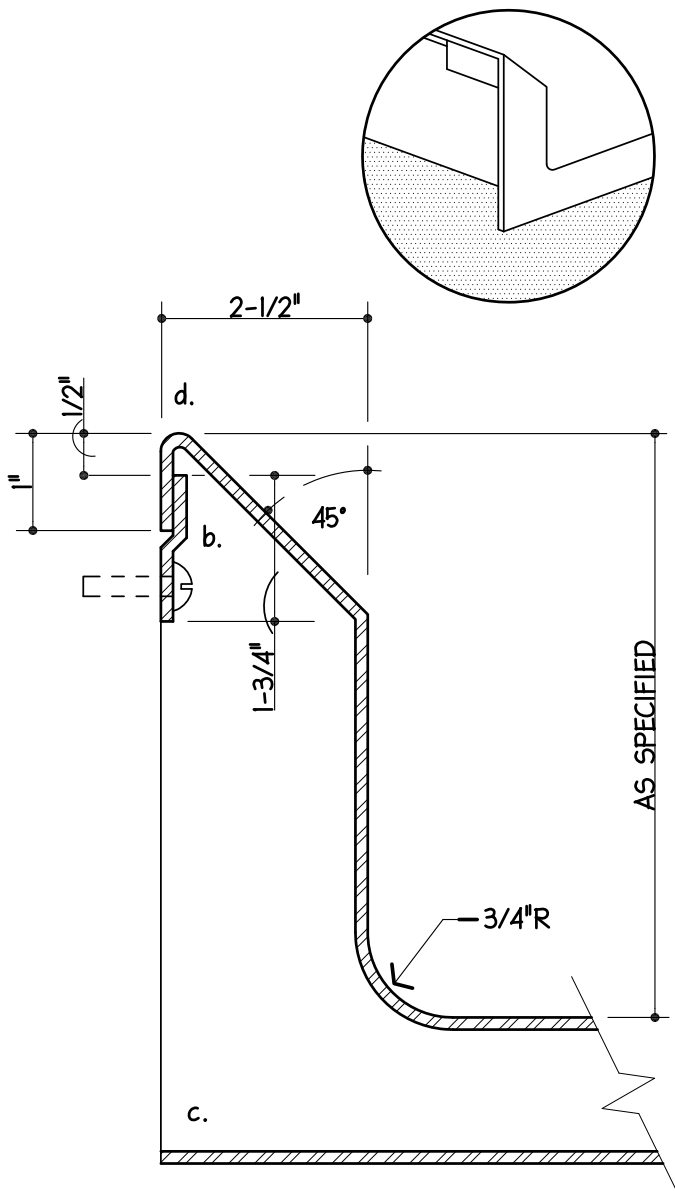
a. AS SPECIFIED, TO MATCH ADJACENT ROLLED EDGES



STRAIGHT TURN DOWN L.



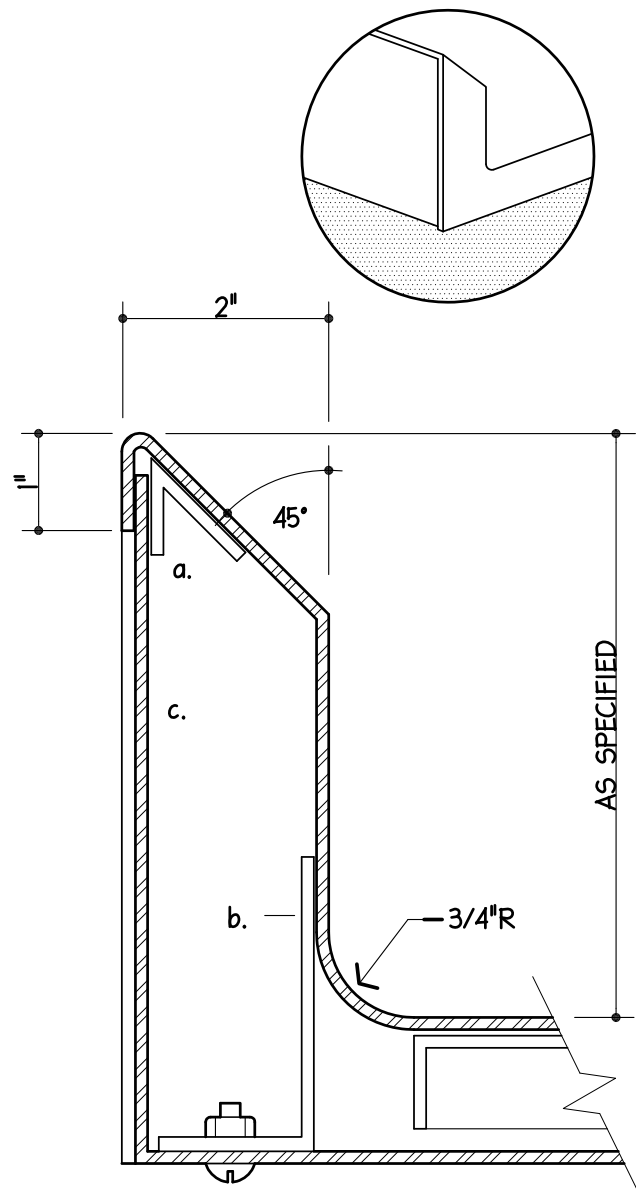
TURNED DOWN EDGE M.



WALL UNIT

DETAIL A

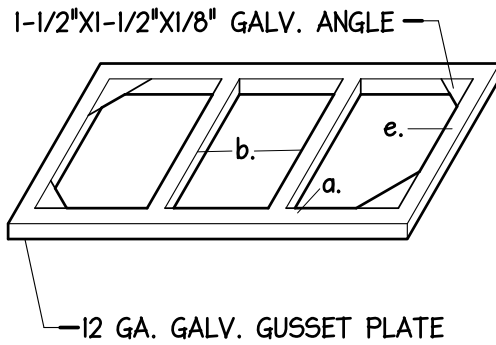
- a. 2-1/2" AT SINK TO ALLOW FOR CONNECTED OVERFLOW
- b. 12 GA. S/S CLIPS, 4" LONG, FASTENED TO EACH WALL END OF EACH UNIT & 4'-0" ON CENTER. SECURE TO WALL W/A MINIMUM OF TWO 1/4"x20 S/S TOGGLE BOLTS OR EXPANSION SHIELDS.
- c. EXPOSED ENDS TO BE FULLY WELDED CLOSED.
- d. SEAL ALL AROUND TO WALL WITH SILICONE SEALANT.



FREE STANDING UNIT

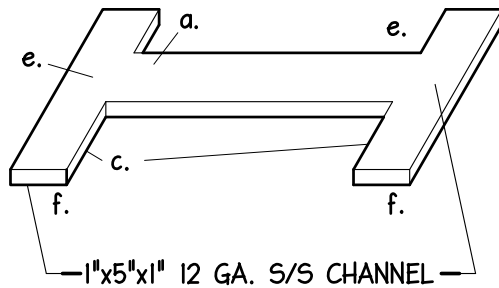
DETAIL B

- a. 1"x1"x14 GA. S/S x1-1/2" LONG RETAINING CLIP WELDED IN PLACE. ONE AT EACH END OF UNIT AND 12" ON CENTER.
- b. 2-1/2"x1-1/2"x1-1/2" 14 GA. S/S CLIP WELDED TO SPLASH. ONE AT OF EACH UNIT & 12" ON CENTER.
- c. 14 GA S/S PANEL SECURED TO CLIPS W/ S/S OVALHEAD BOLT. WELD NUT TO CLIP.
- d. EXPOSED ENDS TO BE FULLY WELDED.



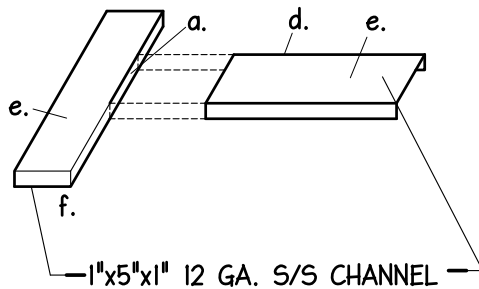
TABLES

A.



DISHTABLES

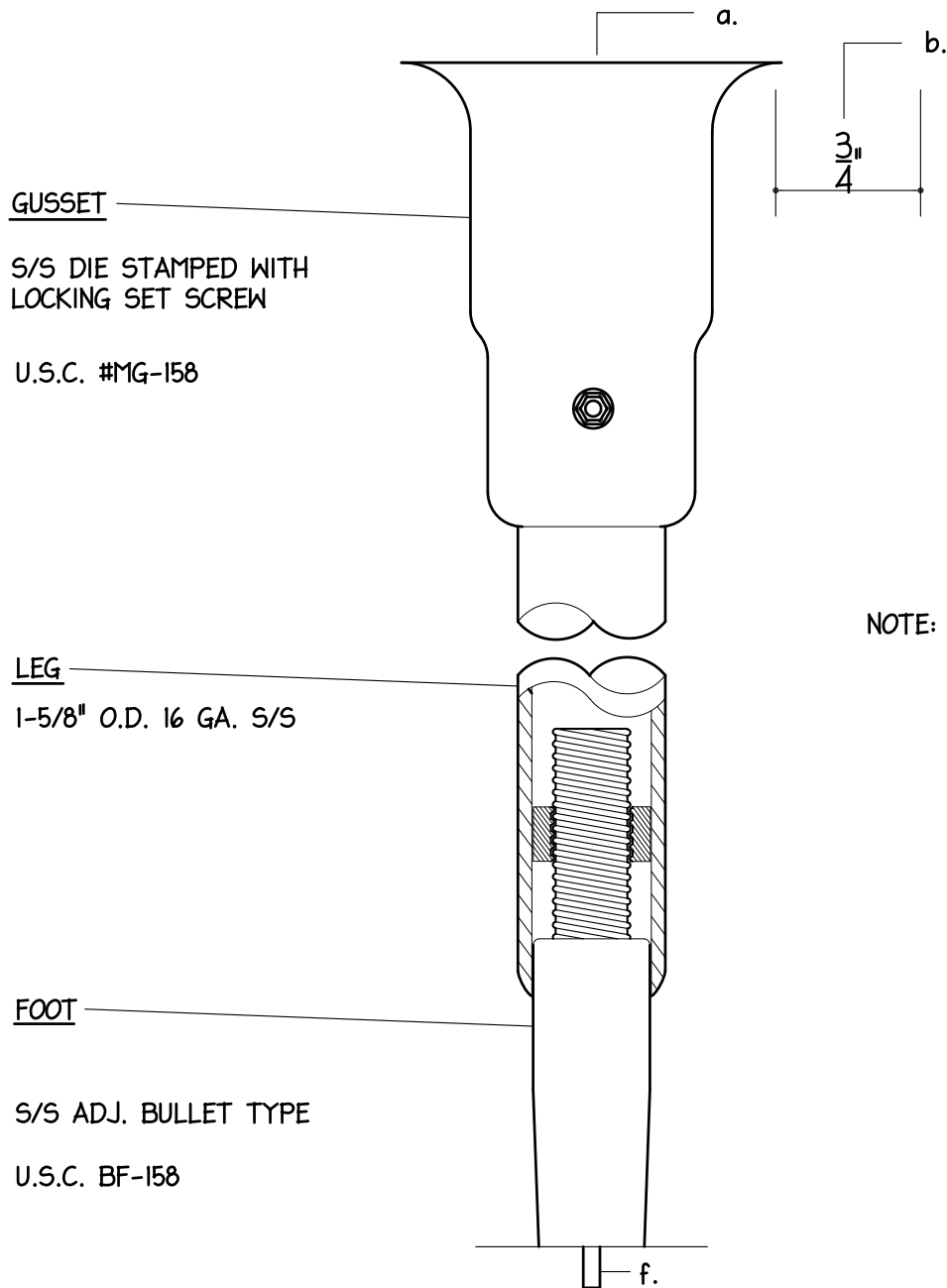
B.



**SINK
DRAINBOARDS**

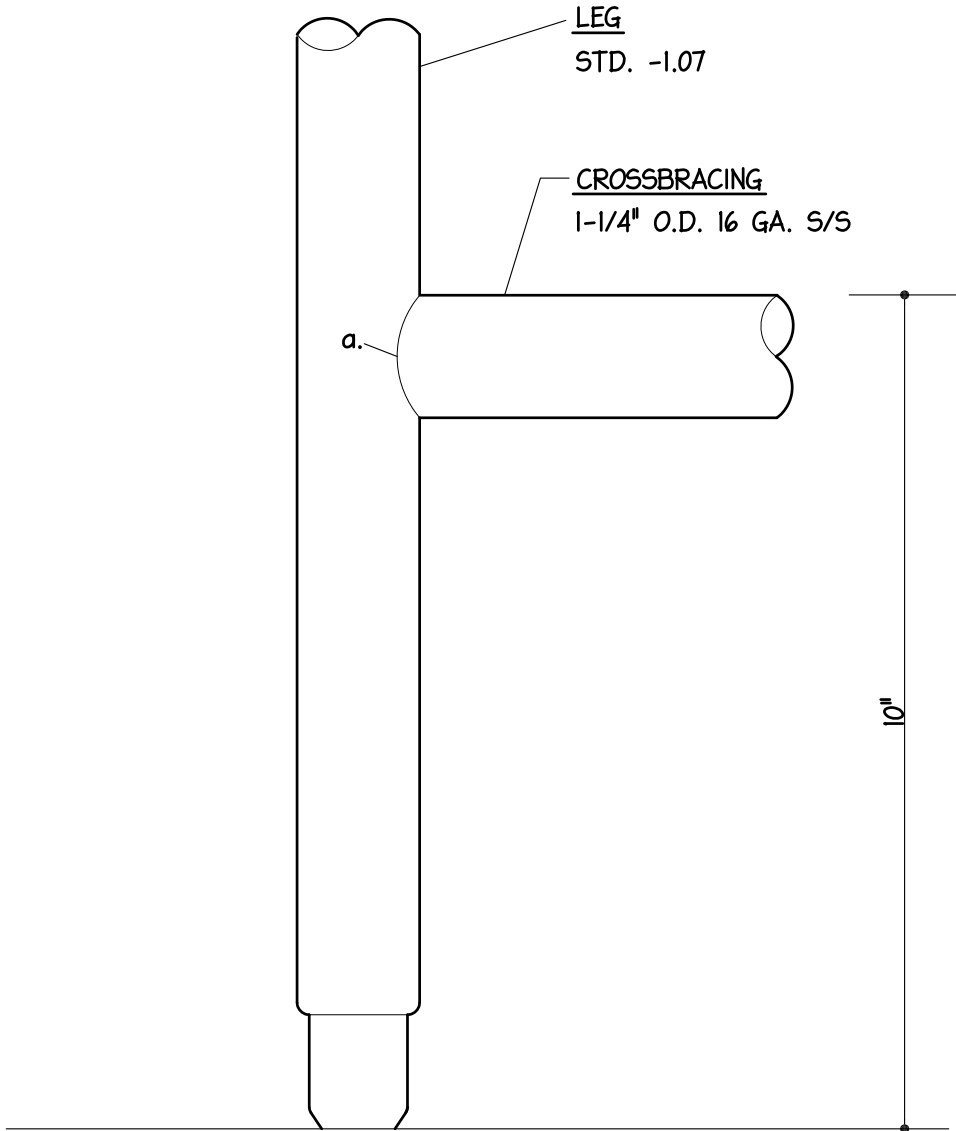
C.

- a. FULLY WELDED CONSTRUCTION.
- b. ANGLE LOCATION - ENDS; SIDES OF TOP INSETS; INTERMEDIATES
24" ON CENTER.
- c. CHANNEL LOCATION - ENDS AND INTERMEDIATE MAXIMUM 6'-6" O.C.
- d. ADD CENTER CHANNEL WHEN DRAINBOARD LENGHT EXCEEDS 2'-6".
- e. SECURE TOP TO FRAMEWORK WITH WELDED STUDS, S/S LOCKWASHERS
AND CAP NUTS.
- f. CLOSE CHANNEL AT FRONT ONLY.



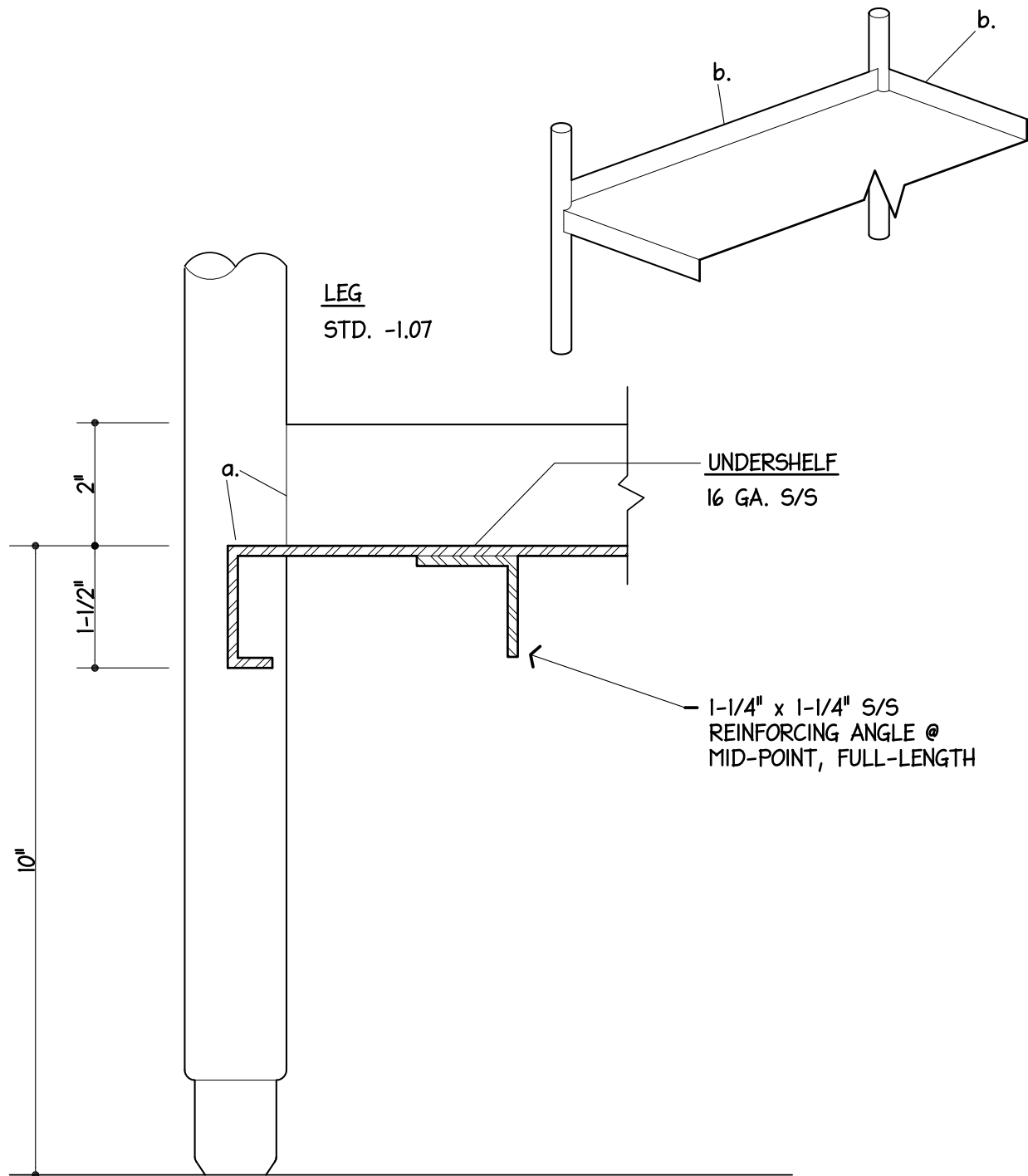
NOTE: ENTIRE FINISHED STRUCTURE AND INDIVIDUAL COMPONENTS TO MEET NSF REQUIREMENTS

- a. FULLY WELD GUSSET TO FRAMEWORK OR SINK
- b. 3/4" MINIMUM CLEARANCE ALL AROUND
- c. SET SCREW NOT VISIBLE TO WORKING SIDE OF EQUIPMENT.
- d. MAXIMUM 1/32" CLEARANCE BETWEEN LEG AND FOOT
- e. FOOT SET AT MIDPOINT TO ALLOW 1" ADJUSTMENT UP AND 1" DOWN. WITHOUT THREAD EXPOSURE.
- f. LEGS UNSUPPORTED Laterally BY CROSSBACKING OR UNDERSHELVES SHALL BE PINNED TO FLOOR USING 1/4" DIA. X 1/2" PINS WELDED TO FOOT AND SET IN MATCHING HOLES IN THE FLOOR.




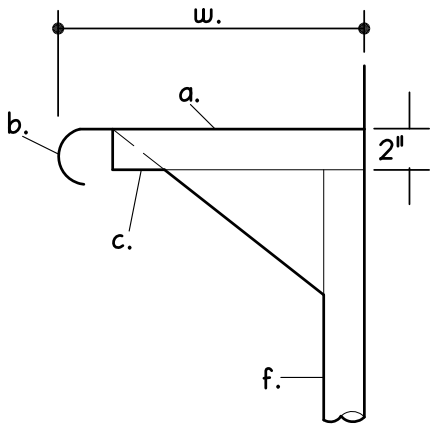
a. FULLY WELD, GRIND SMOOTH AND POLISH.

 <p>NYIKOS ASSOCIATES, INC. Food Facilities Design/Consulting</p>	DESCRIPTION:	STANDARD DTL:
	CROSSBRACING	1.10
		PAGE:
		114000-58

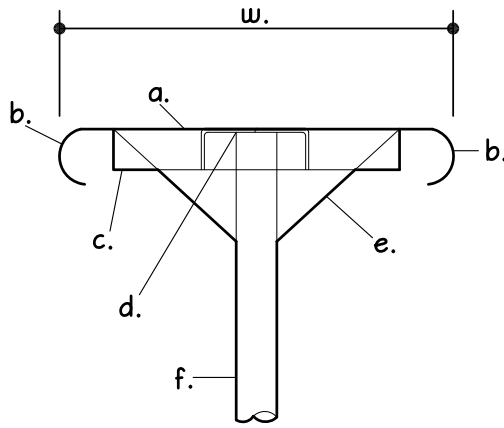


- a. FULLY WELD, GRIND SMOOTH AND POLISH.
- b. WHEN SPECIFIED, TURN REAR AND ENDS UP 2".

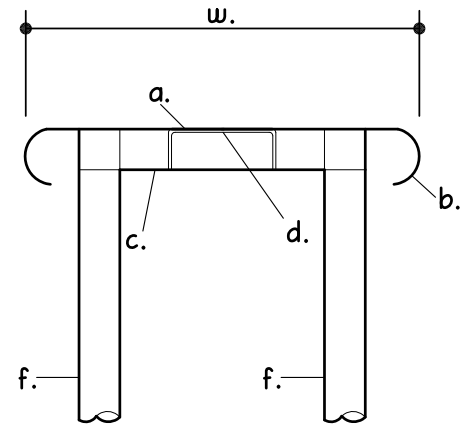
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	UNDERSHELF	1.11
		PAGE:
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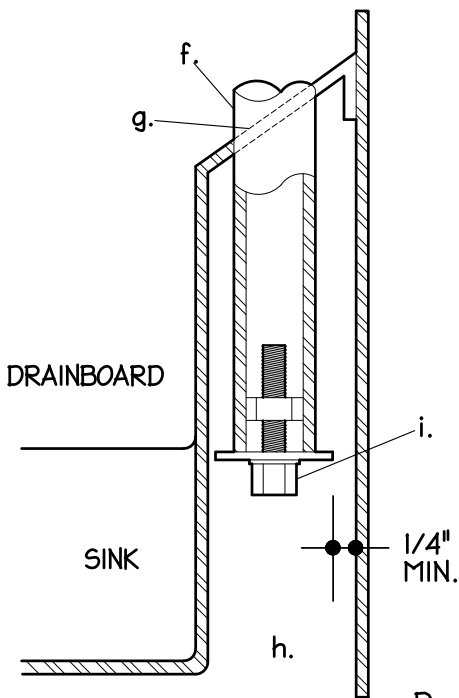
A.



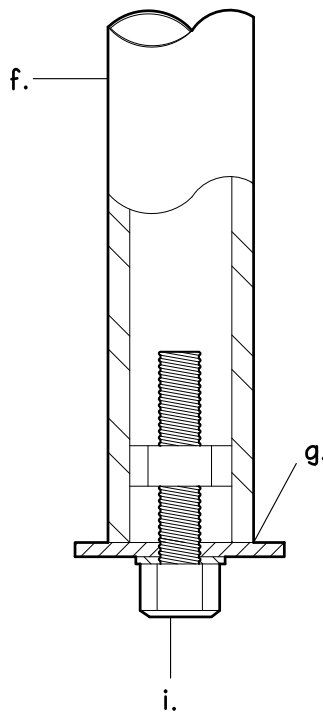
B.



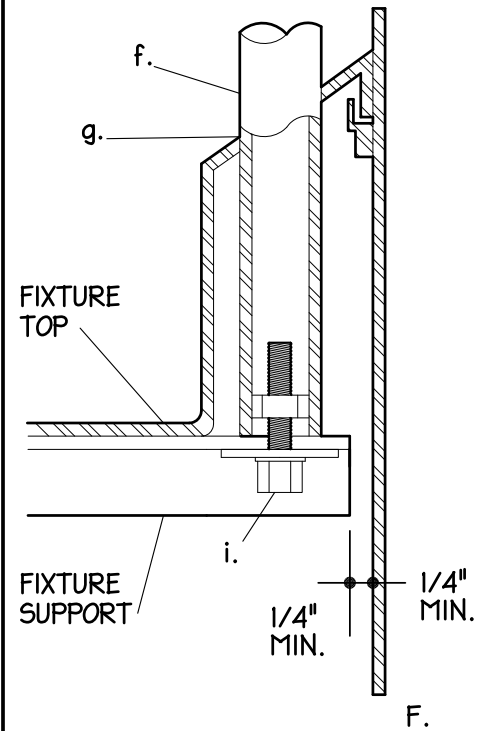
C.



D.

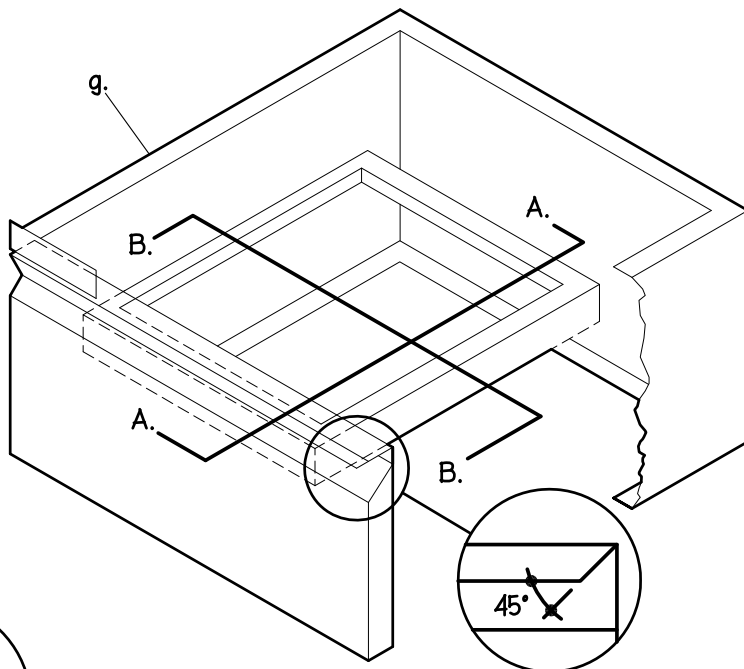


E.

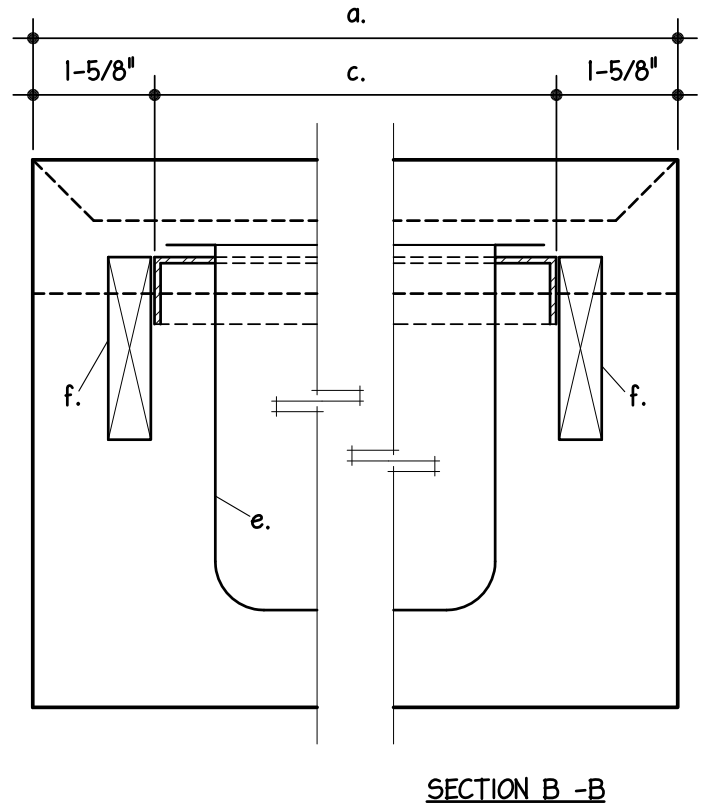
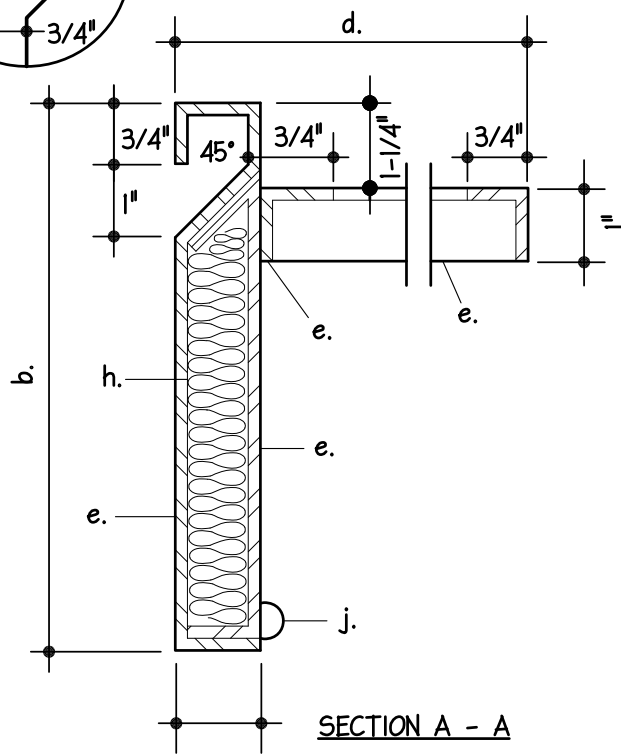
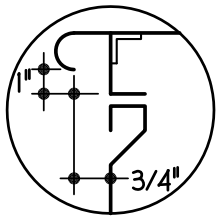


F.

- a. 16 GA S/S SHELF
- b. STD.- 1.02 EDGE
- c. 1"x 3"x 1" 14 GA. S/S CROSS CHANEL
- d. 1"x 3"x 1" 14 GA. S/S LENGTHWISE CHANNEL WHEN LENGTH BETWEEN SUPPORTS EXCEEDS 42"
- e. 14 GA. S/S BRACKETS FULLY WELDED TO SUPPORT AND CHANNEL..
- f. 1-1/4" O.D. 16 GA. S/S UPRIGHT. MAXIMUM 5'-0" ON CENTER.
- g. TIGHT FIT. SEAL WITH SILICONE SEALANT.
- h. 1-1/2"x 1-1/2" 12 GA. S/S CLIPS WELDED TO REAR OF SPLASH AT DRAINBOARD HEIGHT.
- i. 3/8"x 16 S.S. HEX HEAD BOLT, S/S NUT & S/S LOCKWASHER. NUT WELDED IN TUBE.
- w. WIDTH AS SPECIFIED.



- e. 16 GA. S/S ALL WELDED.
- f. 3 PIECE SELF CLOSING DWR. SLIDE AS MFD. BY COMPONENT HARDWARE, S52 SERIES WITH S/S ROLLER BEARINGS. PITCH SLIDE DOWNWARD 3/8" PER FOOT FOR SELF-CLOSING ACTION.
- g. 18 GA. S/S DWR. ENCLOSURE. ALL WELDED.
- h. SEMI - RIGID FIBERGLASS SOUND DAMPENING.
- j. HARD RUBBER DRAWER BUMPER EACH CORNER.



i. PROVIDE DIE - STAMPED #18 GA. S/S DWR. PANS AS FOLLOWS:

TYPE	NO.	PANS	a.	b.	c.	d.
I	1	20x20x5 DP.	25	7-1/2	21-3/4	22-3/4
II	1	20x20x8 DP.	25	10-1/2	21-3/4	22-3/4
III	1	12x20x4 DP.	25	6-1/2	21-3/4	14-1/2
IV	2	12x20x4 DP.	28	6-1/2	26-1/4	22-1/2
V	1	12x20x4 DP.	17	13-1/2	13-1/2	22-1/2

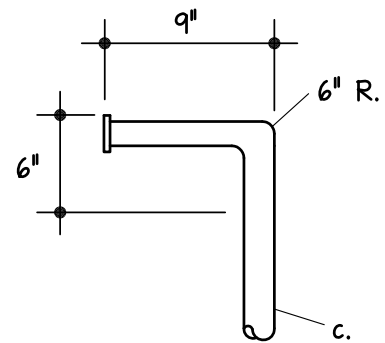
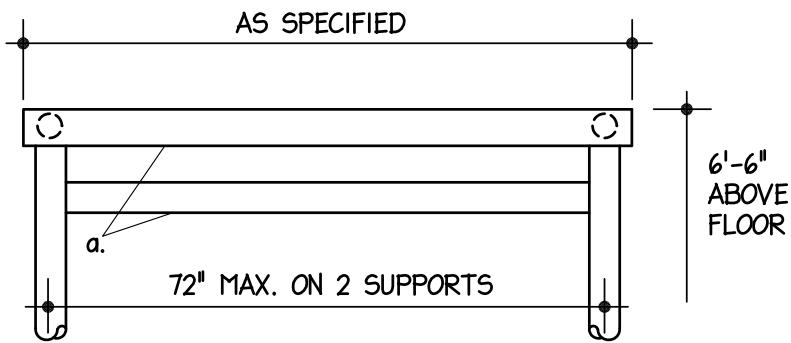


TABLE MTD. SINGLE SIDE a.

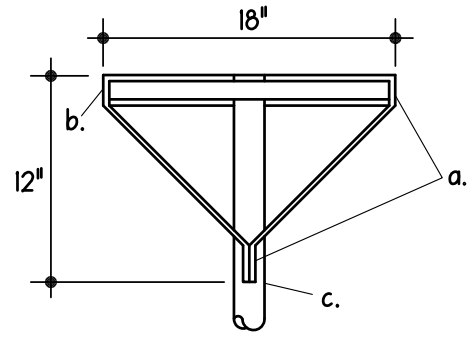
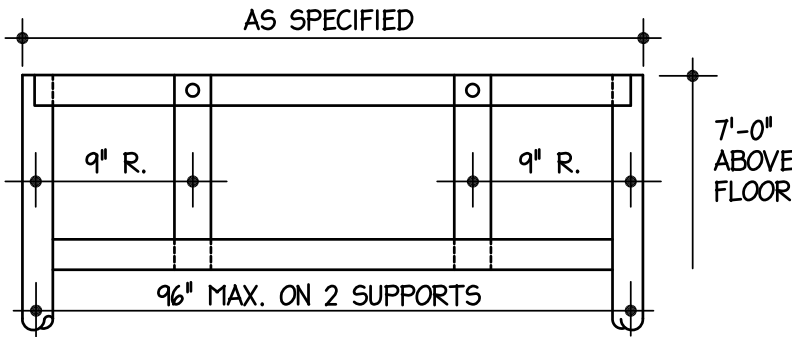
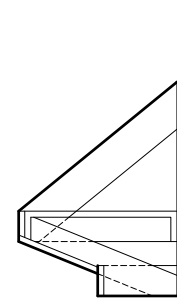
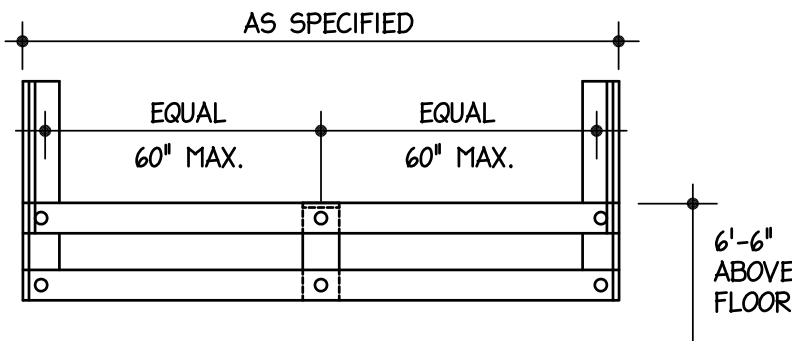
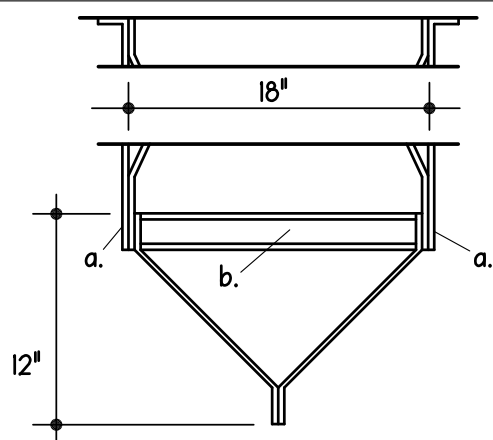
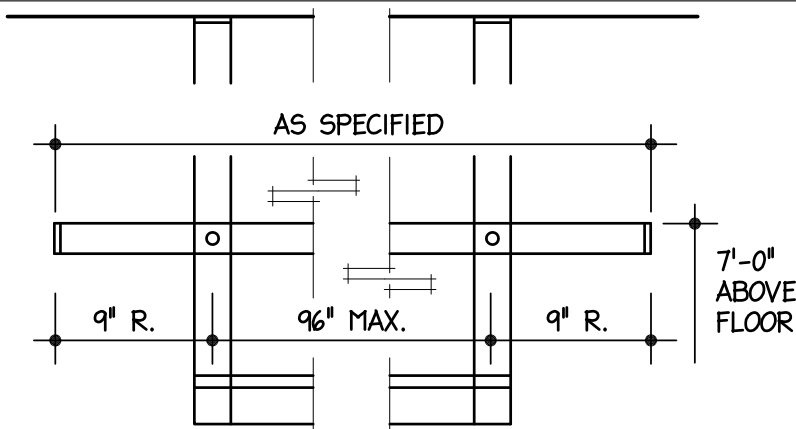


TABLE MTD. DOUBLE SIDE b.



(SECURE TO WALL STRUCTURAL MEMBERS WITH S/S BOLTS)

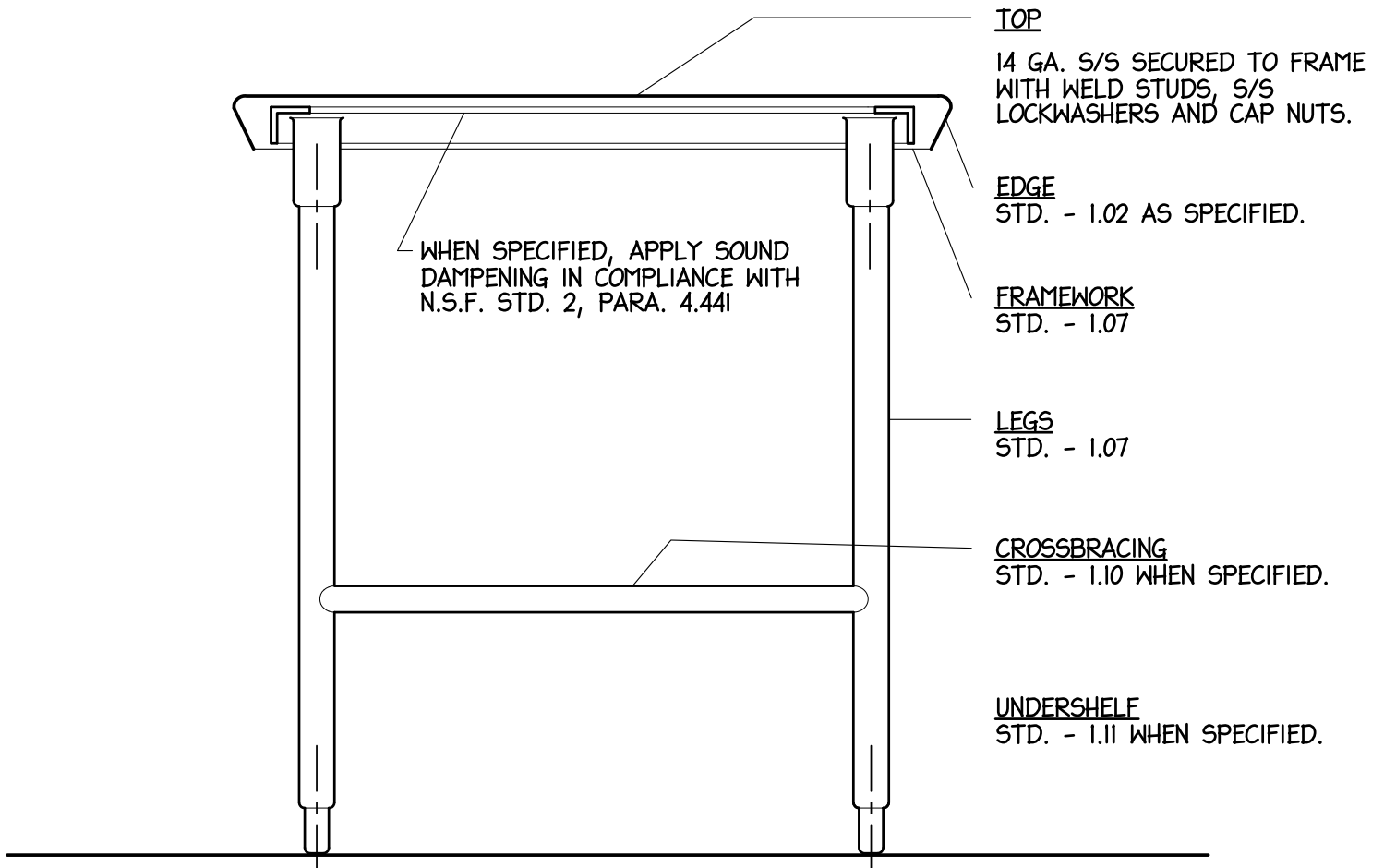
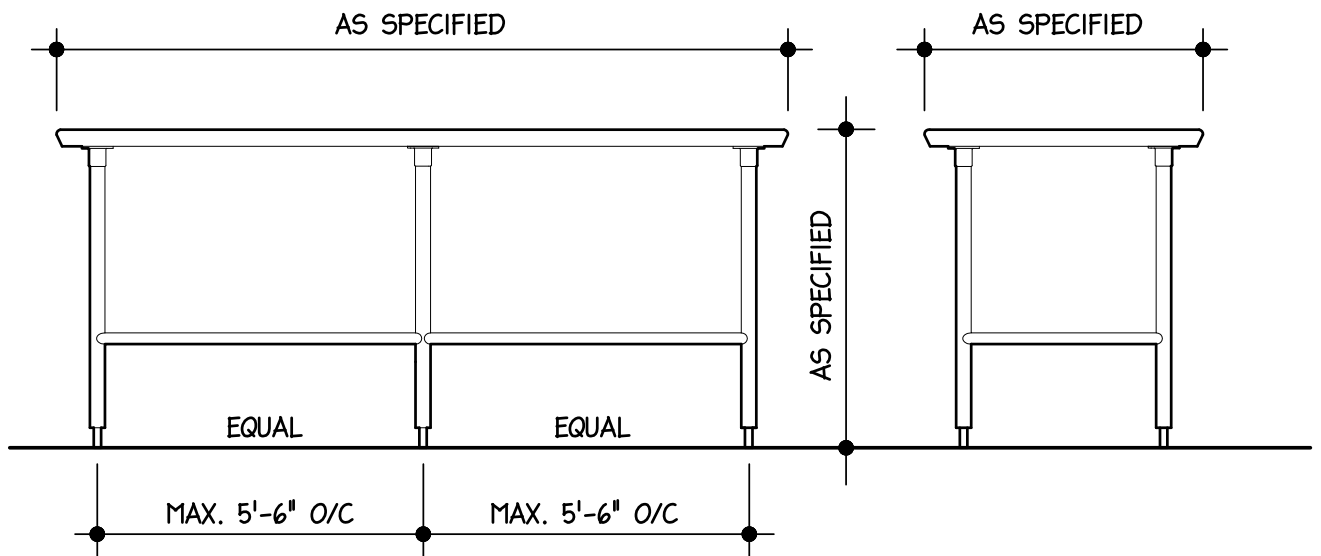
WALL MOUNTED c.

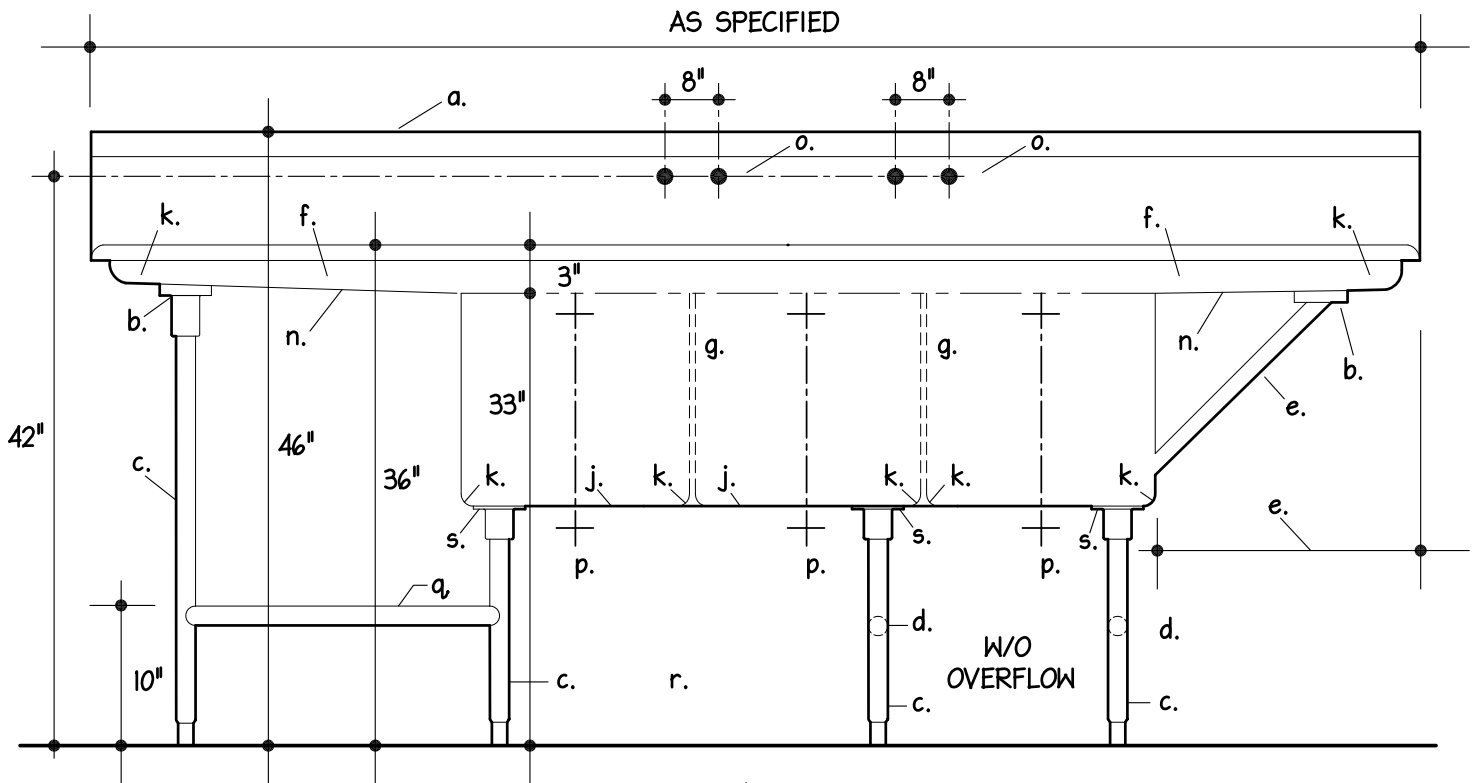


CEILING MOUNTED d.

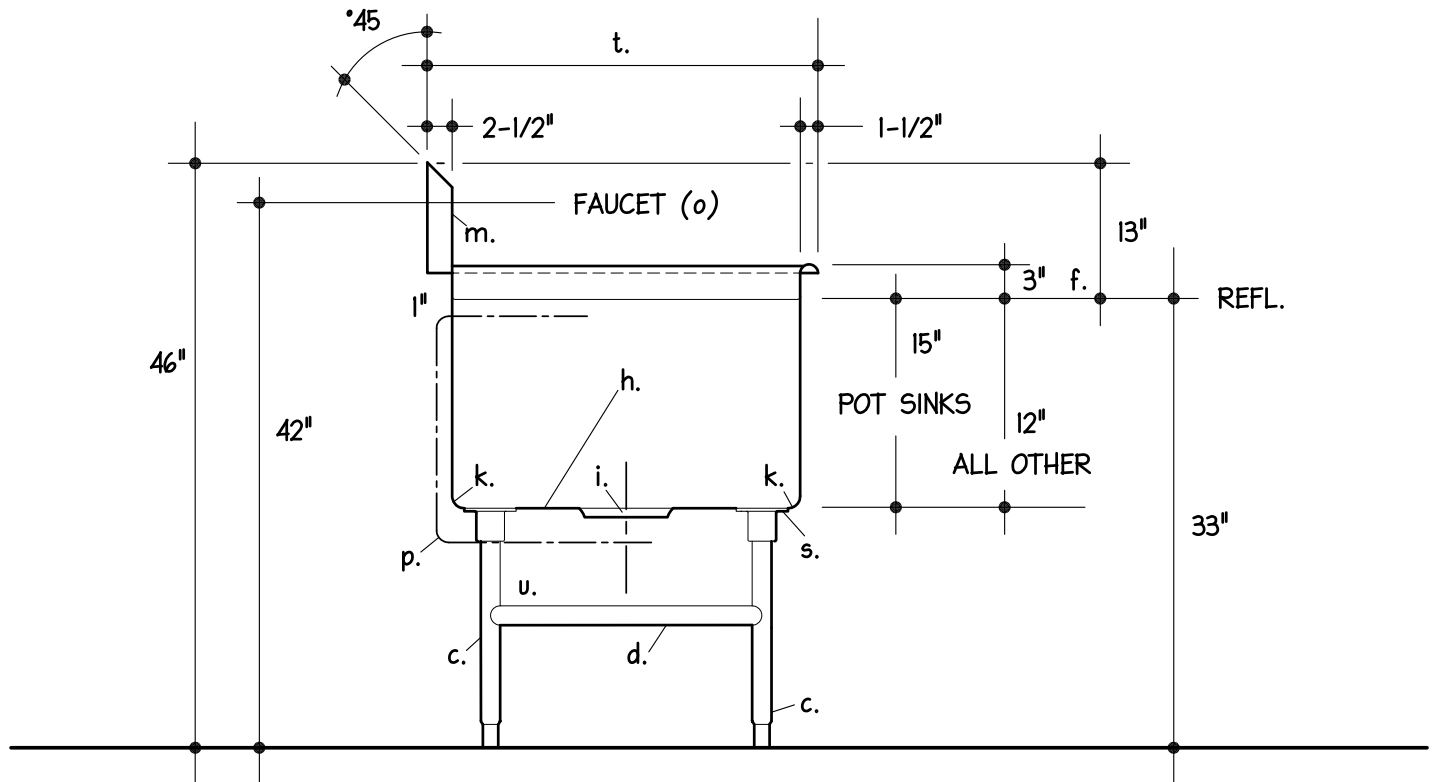
RACKS TO BE ALL WELDED CONSTRUCTION, GROUND SMOOTH AND POLISHED

- a. BANDS - 1/4"x2 S/S BAR.
- b. SPREADERS - 1" O.D. 16 GA. S/S.
- c. UPRIGHTS - 1-5/8" O.D. 16 GA. S/S.
- d. HOOKS - S/S DOUBLE PRONG SNAP-OVER STANDARD KEIL - #1576-1010-1351, 6" O/C.





ELEVATION



TYPICAL SECTION

- a. MATERIAL - 14 GA. S/S.
- b. STD. - 1.05c.
- c. STD. - 1.07
- d. STD. - 1.10

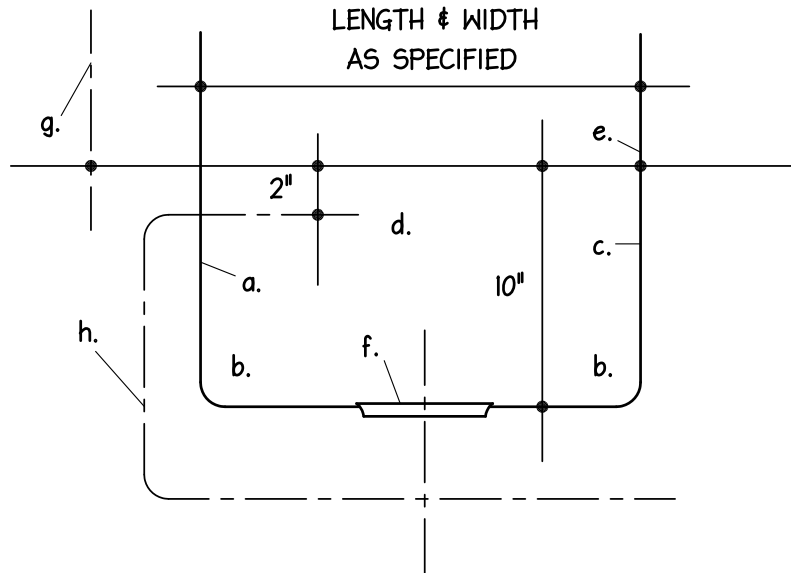
CONTINUED ON STD.- 3.01.I

<p style="margin: 0;">NYIKOS ASSOCIATES, INC. Food Facilities Design/Consulting</p>	<p>DESCRIPTION:</p> <p style="font-size: 1.2em;">SINKS AND DRAINBOARDS</p>	<p>STANDARD DTL:</p> <p style="font-size: 1.5em;">3.01</p>
	<p>PAGE:</p> <p style="font-weight: bold;">114000-64</p>	

- e. DRAINBOARDS UP TO 24" IN LENGTH REQUIRE NO LEGS OR BRACES. DRAINBOARDS 25" TO 30" REQUIRE 1" O.D. 16 GA. S/S BRACE. DRAINBOARDS OVER 30" REQUIRE LEGS AND CHANNEL FRAMEWORK.
- f. DRAINBOARDS SHALL PITCH TO SINK 1/8" PER FOOT OF LENGTH TO PROVIDE COMPLETE DRAINING WITHOUT POOLING. THE 3" HIGH RAISED ROLLED RIM AT THE SINK SHALL DECREASE IN HEIGHT TOWARD THE OUTER ENDS OF THE DRAINBOARD.
- g. PARTITIONS BETWEEN COMPARTMENTS TO BE DOUBLE WALLED CONSTRUCTION WITH ROUNDED TOP, ALL WELDED INTEGRAL WITH SINK BODY.
- h. BACK, BOTTOM, AND FRONT SHALL BE ONE CONTINUOUS PIECE WITH ENDS WELDED INTEGRAL, WITHOUT OVERLAPPING JOINTS OR OPEN SPACES, BETWEEN COMPARTMENTS.
- i. WASTES SHALL BE SEATED IN DIE STAMPED DEPRESSIONS WITHOUT USE OF SOLDER, RIVETS OR WELDING. INSTALLED COMPONENTS SHALL BE FLUSH WITH SURROUNDING SURFACE.
- j. EACH SINK COMPARTMENT TO BE PITCHED AND CREASED TO WASTE TO ASSURE COMPLETE DRAINING WITHOUT POOLING.
- k. ENTIRE UNIT SHALL BE ALL WELDED COVE CORNERED CONSTRUCTION WITH VERTICAL AND HORIZONTAL AND INTERIOR CORNERS HAVING A 3/4" RADIUS.
- l. STD.- 1.02 b EDGE.
- m. STD. - 1.04a. BACKSPLASH.
- n. UNDERSIDE OF DRAINBOARDS AND SINKS TO BE SPRAYED WITH SOUND DAMPENING IN COMPLIANCE WITH N.S.F. STD. 2 PARA 4.44I WHEN SPECIFIED.
- o. FAUCETS - T&S MODEL B-232 WITH AERATOR B-199, REMOVABLE MONEL SEATS AND 1/2" I.P.S. MALE INLETS.
- p. WASTES - 2" NICKEL PLATED BRONZE ROTARY HANDLE WASTE S/S STRAINER PLATE WITH CHROME WITH CHROME PLATED BRASS CONNECTED OVERFLOW, STANDARD- KIEL HARDWARE MFG. CO. #1770-1015-1000.
- q. REAR CROSS BRACING ONLY.
- r. OMIT FRONT AND REAR LENGTHWISE CROSSBRACIG UNDER SINKS.
- s. 12 GAUGE STAINLESS STEEL 6"x 6" TRIANGULAR SUPPORT PLATE WELDED TO UNDERSIDE OF SINKS.
- t. WIDTH AS SPECIFIED.

(END OF SECTION 114000)

 <p>NYIKOS ASSOCIATES, INC. Food Facilities Design/Consulting</p>	DESCRIPTION:	STANDARD DTL:
	SINK AND DRAINBOARDS	3.01.1
		PAGE: 114000-65



TYPICAL SECTION

- a. MATERIAL - 14 GA. S/S
- b. ENTIRE UNIT SHALL BE ALL WELDED COVE CORNERED CONSTRUCTION WITH VERTICAL AND HORIZONTAL AND INTERIOR CORNERS HAVING A 3/4" RADIUS.
- c. TWO SIDES AND BOTTOM SHELL BE ONE CONTINUOUS PIECE WITH ENDS WELDED INTEGRAL WITHOUT OVERLAPPING JOINTS.
- d. PARTITIONS BETWEEN COMPARTMENTS TO BE DOUBLE WALLED CONSTRUCTION WITH ROUNDED TOP, ALL WELDED INTEGRAL WITH SINK.
- e. FULLY WELD SINK TO TOP WITHOUT OVERLAPPING JOINTS.
- f. WASTES SHALL BE SEATED IN DIE STAMPED DEPRESSIONS WITHOUT USE OF SOLDER RIVETS OR WELDING . INSTALLED COMPONENTS SHALL BE FLUSH WITH SURROUNDING SURFACE.
- g. FAUCET - T&S MODEL B-222 FAUCET WITH B-199 AERATOR, REMOVABLE MONEL SEATS AND 1/2" IPS MALE INLETS.
- h. WASTES - 1-1/2" NICKEL PLATED BRONZE ROTARY HANDLE WASTE AND S/S STRAINER PLATE WITH CHROME PLATED BRASS CONNECTED OVERFLOW, STANDARD-KEIL HARDWARE COMPANY NO. #1770-1015-1000.

(END OF SECTION 114000)

 <p>NYIKOS ASSOCIATES, INC. Food Facilities Design/Consulting</p>	<p>DESCRIPTION:</p> <p style="text-align: center;">COUNTER TOP SINKS</p>	<p>STANDARD DTL:</p> <p style="text-align: center;">3.04</p>
		<p>PAGE:</p> <p style="text-align: center;">114000-66</p>

SECTION 11 51 23 - LIBRARY STACK SYSTEMS**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Modular library shelving system.

1.2 SUBMITTALS

- A. Product Data: For each type of library shelving system and accessory specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings: Show plans, elevations, ends, cross-sections, and installation and anchorage details.
- C. Samples: Of each exposed product and for each color and finish required, 6 inches square.
- D. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For certified wood: Documentation indicating percentage new wood, percentage FSC and Chain-of-Custody (CoC) certificates indicating compliance with forest certification requirements. Include vendor invoice indicating FSC CoC.
 - 2. EQ Credit 2: Low-Emitting Materials
 - a. For composite wood installed within the building interior: Documentation indicating no added formaldehyde resins or compliance with California Air Resources Board (CARB) Airborne Toxic Control Measures (ATCM) for ultra-low-emitting formaldehyde (ULEF) resins.

1.3 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide shelving and accessories manufactured by the same manufacturer.
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."
- C. Forest Certification: Provide wood products made from forests certified by an FSC-accredited certification body. All non-FSC wood in assemblies with FSC-certified wood shall meet the FSC Controlled Wood (CW) criteria.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify library shelving system placement by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating shelving system without field measurements. Coordinate work of other contracts to ensure actual installation dimensions correspond to established dimensions.
- B. Space Enclosure and Environmental Limitations: Do not install library shelving until spaces are enclosed and weatherproof, wet-work in spaces is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are being maintained at the levels indicated for Project when occupied for its intended use.

1.5 COORDINATION

- A. Coordinate layout and installation of shelving with work of other contracts.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. BCI Libraries (Basis-of-Design); Product Ratio Shelving.
 - 1. Provide Ratio B system design of open floor space with bottom shelf 9 inches above floor (no kickplate); include top shelf.
- B. Spacesaver; equivalent product and aesthetic accepted by Architect.

2.2 MAXIMUM LOAD

- A. Wooden and steel shelves are to be loaded with a maximum of 60 kg (132.3 lbs).

2.3 BAY CONSTRUCTION

- A. A starter bay includes one right and one left end panel with holes on the inside of the panel. To add another bay, take off the right end panel, insert the add-on bay (with one intermediate panel with holes on both sides) and fix the right end panel to the add-on bay.
- B. Review with manufacturer and Architect conditions with various height adjacencies.

2.4 BAYS WITH CASTORS

- A. Castors are hard and with brakes.
- B. Max. load of 90 kg (198 lbs) per castor.
- C. Unit Types: Double-sided shelving with frame support with a max. height of 1768 mm (69.6"); and double-sided shelving with traverse/back panel with a max. height of 2056 mm (81").
- D. Casters to be mounted on a max. of 2 adjoining bays.

2.5 SHELVES WITH SCREWS AND PINS

- A. Wooden and steel shelves to be delivered with either screws (for fixation) or pins (for insertion).
- B. Each bay must have at least 2 shelves (4 shelves for double-sided bays) - top and bottom - screwed into the panels for stability; remaining shelves can be inserted via pins.

2.6 ASSEMBLY

- A. Wooden shelving units come knocked-down; no special fittings or tools are needed.

2.7 STEEL COMPONENTS

- A. Steel components to be powder coated with thermo hardened polyester powder. The thickness of the coating is thicker than 60 mil (except micro-perforated plate).
- B. Gloss level, unless otherwise required is 65%.
- C. Polyester powder cannot include: azo dyes that can release a leaving carcinogenic amine component; triglycidylisocyanurate (TGIC); heavy steel-containing pigments such as lead and cadmium; volatiles.

2.8 TRAVERSES

- A. Traverses to be galvanized steel.

2.9 BACK FRAMES

- A. Back frames to be rectangular steel tubes.

2.10 SHELVES

- A. Shelves are made of 1 mm (19 gauge) lacquered steel.

2.11 WOODEN COMPONENTS

- A. The surface of the wooden components either have a transparent lacquered veneer finish or a high pressure decorative laminate coating; refer to Drawings.

2.12 VENEERED AND PLASTIC COATED END, FUNCTIONAL OR INTERMEDIATE PANELS

- A. End panels are made of 25 mm (1") particle board.

2.13 VENEERED AND PLASTIC COATED BACK PANELS

- A. Back panels are made of 16 mm (5/8") E1 quality particle board.

2.14 VENEERED AND PLASTIC COATED SHELVES

- A. 500, 750 and 900 mm shelves are made of 25 mm (1") particle board.
- B. 1000 mm shelves are made of 25 mm (1") blockboard (to prevent shelf from sagging).

2.15 VENEERED AND PLASTIC COATED DOORS

- A. Doors are made of 19 mm (3/4") quality particle board.

2.16 OTHER COMPONENTS

- A. Glass doors are made of 6 mm (1/4") safety glass.
- B. Glass doors with frame are made of 19 mm (3/4") quality particle board and 4 mm glass.

2.17 ACCESSORIES

- A. Shelf Label Holders: Plastic, for card size.
- B. Special Shelves: Provide special shelving units for the following as required:
 1. Videos.
 2. Periodicals.
- C. Casters: Manufacturers heavy-duty casters.

2.18 FINISHES, GENERAL

- A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for conditions affecting performance of library shelving system.
- B. Examine areas for suitable conditions where library shelving is to be anchored.
- C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install library shelving system level, plumb, square, and true with integral adjustable leveling devices. Using shims shall not be permitted. Install to a tolerance of 1/8 inch in 96 inches for level and plumb shelves.
- B. Anchor single-faced ranges to wall construction by method recommended by manufacturer.

END OF SECTION

SECTION 11 53 13 - LABORATORY FUME HOODS**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Bench-top laboratory fume hoods.
 - 2. Fume hood base stands with countertops.
 - 3. Fume hood shroud to ceiling.
 - 4. Laboratory cup sinks in fume hoods.
 - 5. Water, laboratory gas, and electrical service fittings in fume hoods.
 - 6. Piping and wiring within fume hoods for service fittings, light fixtures, blower switches, and other electrical devices.
- B. Related Sections include the following:
 - 1. Division 12 Section "Wood Laboratory Casework" for laboratory cabinets, including countertops, sinks, and service fittings.
 - 2. Division 23 Sections for fume hood duct connections, including ducts.
 - 3. Division 22 and 26 Sections for installing service fittings in fume hoods, including piping and wiring within fume hoods, and for other wiring in fume hoods, including connecting light fixtures, blower switches, and other electrical devices.
 - 4. Division 22 and 26 Sections for connecting service utilities at back of fume hoods. Piping and wiring within fume hoods are specified in this Section.

1.2 PERFORMANCE REQUIREMENTS

- A. Containment: Provide fume hoods that comply with the following when tested according to ASHRAE 110 as modified below at a release rate of 4.0 L/min.:
 - 1. Average Face Velocity: 100 fpm plus or minus 10 percent with sashes fully open.
 - 2. Face Velocity Variation: Not more than 10 percent of average face velocity.
 - 3. Sash Position: Fully open.
 - a. Test hoods with horizontal sashes with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.
 - b. Test hoods with combination sashes fully raised, with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.
 - 4. As-Manufactured (AM) Rating: AM 0.10.
- B. Static-Pressure Loss: Not more than 3/8-inch wg at 100-fpm) face velocity when tested according to Paragraph 6.4.2.4 in SEFA 1.2, "Laboratory Fume Hoods--Recommended Practices."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For laboratory fume hoods. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Indicate details for anchoring fume hoods to permanent building construction including locations of blocking and other supports.
 - 2. Indicate locations and types of service fittings together with associated service supply connection required.

3. Indicate duct connections, electrical connections, and locations of access panels.
 4. Include roughing-in information for mechanical, plumbing, and electrical connections.
 5. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from above items.
 6. Include coordinated dimensions for laboratory equipment specified in other Sections.
- C. Samples for Initial Selection: For factory-applied finishes epoxy sinks.
- D. Product Test Reports: Based on evaluation of comprehensive tests according to SEFA 1.2, "Laboratory Fume Hoods--Recommended Practices" and ASHRAE 110 performed by manufacturer and witnessed by a qualified independent testing agency, for fume hoods.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain laboratory fume hoods through one source from a single manufacturer.
- B. Product Designations: Drawings indicate sizes and configurations of laboratory casework by referencing designated manufacturer's catalog numbers. Unless modified by notation on Drawings, or otherwise specified, catalog description for designated product constitutes requirements for each product and establishes a standard of design and quality for materials, construction and workmanship. Other acceptable manufacturers' laboratory casework of similar sizes, similar door and drawer configurations, and complying with the Specifications will be accepted.
- C. Product Standard: Comply with SEFA 1.2, "Laboratory Fume Hoods--Recommended Practices."
- D. Safety Glass: Products complying with testing requirements in 16 CFR 1201 for Category II materials.
1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
- E. 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.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Administrative Requirements."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install fume hoods until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 COORDINATION

- A. Coordinate installation of fume hoods with laboratory casework, fume hood exhaust ducts, and plumbing and electrical work.

1.8 EXTRA MATERIALS

- A. Furnish complete touchup kit for each type and color of fume hood finish provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged fume hood finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Kewaunee Scientific Corporation, Laboratory Products Group; (Basis-of-Design) Product, Model 60-inch wide Bench-Style Double-Faced Demo Hood 6725G.
 2. Fisher Hamilton L.L.C.
 3. Campbell Rhea
 4. Labconco Corporation.
 5. Collegedale Casework, LLC.

2.2 MATERIALS

- A. Steel Sheet: Cold-rolled commercial steel sheet, complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.
- B. Glass-Fiber-Reinforced Polyester: Polyester laminate complying with ASTM D 4357, with a chemical-resistant gel coat on the exposed face, and having a flame-spread index of 25 or less per ASTM E 84.
- C. Epoxy: Factory molded of modified epoxy-resin formulation with smooth, nonspecular finish.
 1. Physical Properties:
 - a. Flexural Strength: Not less than 10,000 psi.
 - b. Modulus of Elasticity: Not less than 2,000,000 psi.
 - c. Hardness (Rockwell M): Not less than 100.
 - d. Water Absorption (24 Hours): Not more than 0.02 percent.
 - e. Heat Distortion Point: Not less than 260 deg F.
 2. Flame-Spread Index: 25 or less per ASTM E 84.
 3. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
 - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
 - b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
- D. Laminated Safety Glass: ASTM C 1172, Kind LT, Condition A, Type I, Class I, Quality q3 with clear, polyvinyl butyral interlayer.

2.3 CONVENTIONAL FUME HOODS

- A. Provide conventional fume hoods with constant volume bypass. With sash closed, hood maintains a slight negative pressure to confine fumes.

2.4 FABRICATION

- A. General: Preassemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations. Fume hoods shall be capable of

- being partly disassembled as necessary to permit movement through a 35-by-79-inch door opening.
- B. Steel Exterior: Fabricate from steel sheet, not less than 0.0478 inch thick, with component parts screwed together to allow removal of end panels, front fascia, and airfoil and to allow access to plumbing lines and service fittings. Apply chemical-resistant finish to interior and exterior surfaces of component parts before assembly.
 - C. Ends: Fabricate with double-wall end panels without projecting corner posts or other obstructions to interfere with smooth, even airflow. Close area between double walls at front of fume hood and as needed to house sash counterbalance weights, utility lines, and remote-control valves.
 - D. Interior Lining: Provide the following, unless otherwise indicated:
 - 1. Glass-fiber-reinforced polyester, not less than 1/4 inch thick.
 - E. Molded Glass-Fiber-Reinforced Polyester Lining: Molded unit consisting of end panels, back panel, preset rear baffle, and top bonded together into a single piece; reinforced to form a rigid assembly to which exterior is attached.
 - 1. Punch fume hood lining side panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.
 - F. Exhaust Plenum: Full width of fume hood and with adequate volume to provide uniform airflow from hood, of same material as hood lining, and with duct stub for exhaust connection.
 - 1. Duct-Stub Material: Epoxy-coated steel, stainless steel, or glass-fiber-reinforced polyester.
 - G. Fume Hood Shroud: Provide a steel sheet metal shroud, same width and depth as fume hood that extends from top of fume hood to ceiling to conceal top of unit and all associated ductwork and utilities.
 - 1. Finish to match fume hood exterior selection.
 - H. Sashes: Provide operable sashes of type indicated.
 - 1. Fabricate from 0.0478-inch- minimum thickness steel sheet, with chemical-resistant finish. Form into four-sided frame with bottom corners welded and finished smooth. Make top member removable for glazing replacement. Set glazing in chemical-resistant, U-shaped gaskets.
 - 2. Glaze with laminated safety glass, with 3-mm-thick plies.
 - 3. Counterbalance vertical sliding sash with sash weight and stainless-steel cable system. Provide ball-bearing sheaves, plastic glides in stainless-steel guides, and stainless-steel lift handles. Provide rubber bumpers at top and bottom of each sash unit.
 - 4. Provide sash opening height of 27 to 30 inches, unless otherwise indicated.
 - 5. Sash to be self-closing to 18 inches.
 - I. Provide airfoil at bottom of sash opening to direct airflow across countertop from 1-inch space between airfoil and countertop.
 - J. Light Fixtures: Provide vaporproof, two-tube, rapid-start, fluorescent light fixtures, of longest practicable length; complete with tubes at each fume hood. Shield tubes from hood interior with 1/4-inch- thick laminated glass or 3-mm-thick tempered glass, sealed into hood with chemical-resistant rubber gaskets. Provide units with fluorescent tubes easily replaceable from outside of fume hood.
 - 1. Provide fluorescent tubes with color temperature of 3500 K and minimum color-rendering index of 85.
 - K. Fume Hood Base Stands: Fabricated from 0.0625- and 0.0500-inch-thick furniture grade, cold-rolled steel. Weld frame to form a rigid assembly with pipe chases at one side. The chase end

panel is attached with screws and is removable for installation of plumbing and electrical services. Provide a removable enclosure panel at the rear of the base assembly. Finish entire assembly with chemical-resistant finish. Provide leveling device at each corner of base stand at floor.

1. Modify to provide clear floor space and work heights not less than required to comply with Americans with Disabilities Act Architectural Guidelines ADAAG.

L. Countertops and Cup Sinks:

1. Resin Countertops: Fabricate with front overhang of 1 inch over base cabinets, continuous drip groove on underside 1/2 inch from edge, and factory cutouts for sinks.
 - a. Countertop Material: Epoxy composition, uniform throughout full thickness.
2. Cup Sinks: Epoxy, 3-by-6-inch nominal size.
 - a. Provide with stainless-steel strainers and integral tailpieces.

M. Comply with requirements in Divisions 23 and 26 Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings. Securely anchor fittings, piping, and conduit to fume hoods, unless otherwise indicated.

1. Units are to be pre-piped and pre-wired by manufacturer for Division 23 and 26 Contractor's to connect to on exterior of unit.

2.5 CHEMICAL-RESISTANT FINISH

- A. Preparation: Clean steel surfaces, other than stainless steel, of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- B. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply fume hood manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
 2. Colors for Fume Hood Finish: As selected by Architect from manufacturer's full range.

2.6 ACCESSORIES

- A. Service Fittings: Comply with requirements in Division 12 Section "Wood Laboratory Casework."
1. Provide service fittings with exposed surfaces, including fittings, escutcheons, and trim, finished with acid- and solvent-resistant, baked-on plastic coating in manufacturer's standard color as approved by Architect.
- B. Mobile Flammable Storage Cabinet: Safety cabinet constructed 1-inch, 9-ply high density plywood, finished in standard caution yellow, with "flammable diamonds" on each door and "KEEP FIRE AWAY" in red
- C. Airflow Indicator: Provide fume hoods with airflow indicator of the following type:
1. Indicator Type: Direct-reading aneroid (Magnehelic-type) gage that measures fume hood exhaust duct static pressure as an indication of airflow.
 2. Indicator Type: Thermal anemometer that measures fume hood face velocity and indicates whether it is below normal, normal, or above normal.
 3. Indicator Type: Thermal anemometer that measures fume hood face velocity and displays data as digital readout.
 4. Indicator Type: Any indicator type above.

- D. Airflow Alarm: Provide fume hoods with audible and visual alarm that activates when airflow sensor reading is outside of preset range.
1. Provide with either thermal-anemometer or aneroid (Magnehelic-type) gage airflow sensor.
 2. Provide with reset and test switches.
 3. Provide with switch that silences audible alarm and automatically resets when airflow returns to within preset range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fume hoods according to Shop Drawings and manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and adjacent laboratory casework. Securely attach access panels, but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Comply with requirements in Divisions 15 and 16 Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings and manufacturer's written instructions. Securely anchor fittings, piping, and conduit to fume hoods, unless otherwise indicated.

3.3 ADJUSTING AND CLEANING

- A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.
- B. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION

SECTION 11 61 33 – RIGGING SYSTEMS AND CONTROLS**PART 1 - GENERAL****1.1 REFERENCE TO OWNER'S GENERAL CONDITIONS**

- A. The Owner's / Project General Conditions shall be considered part of this Specification. Unless this Section contains statements, which are more definitive or more restrictive than those contained in the Owner's General Conditions, this Specification shall not be interpreted as waiving or overruling any requirements expressed in the General Conditions documentation.

1.2 SUMMARY

- A. Statement of Work: the work of this section includes, but is not necessarily limited to the following:
1. Provide and install complete and operational Theater Rigging System(s) with controls as outlined in these specifications and related drawings and documentation requirements as set forth in this documentation.
 2. Equipment and systems shall be installed at the Glenridge Middle School located in Prince George's County Maryland.
 3. It is the responsibility of the Contractor to provide all wiring, plates, connections, equipment, rigging, all support means and miscellaneous equipment for complete and fully operational System(s) if specified in this or other related documents or not.
 4. Included Spaces:
 - a. Cafeteria/Stage
 - b. Production Multi-Media Room
- B. Provide for the coordination, provision, installation, inspection, testing, instruction, and warranties of the Rigging System(s) and Controls.
- C. Provide all materials, equipment, transportation, and necessary labor for a complete and operational Rigging System(s) and Controls.
- D. Additional contractor requirements:
1. Required licenses, permits and low voltage permits including any required bonding or insurance requirements to comply with general conditions of specifications and contract documentation.
 2. Verification of the dimensions and conditions at the job site.
 3. Installation in accordance with the contract documentation, applicable installation procedures or codes as set forth by the state or county of the project or manufacturers' recommendations.
 4. Submittal information and provisions.
 5. Instruction of operating personnel.
 6. Manuals and provisions thereof.
 7. Maintenance and warranties.

1.3 RELATED DOCUMENTS

- A. General: Comply with all Contract Documents, including, but not limited to, Divisions 0, 1, 5, 11, 26, 16, 23, 27 and the general contract specifications.
- B. Related specification sections:
1. Section 26 55 61 Theater Lighting Systems
 2. Section 11 61 43 Stage Curtains
 3. Section 27 41 13 Projection Screens

1.4 RELATED WORK

- A. The Contractor shall coordinate with Electrical Contractor on raceway / junction box locations for equipment and routing of cables / raceway from equipment, terminal and pull boxes to system equipment racks and or wall fields.
- B. Conduits / Infrastructure:
 - 1. Provide a written acceptance of all field conditions or a list of any discrepancies within ten (10) working days from Notice to Proceed.

1.5 DEFINITIONS:

- A. Regardless of their usage in codes or other industry standards, certain words or phrases as used in the Drawings or Specifications for the Work, shall be understood to have the specific meanings as ascribed to them in the following list:
 - 1. The term "Contractor" – Integrator who has been awarded the contract to perform the work under this section.
 - 2. The terms "shall" is mandatory, "will" is informative, and "should" is advisory.
 - 3. "Provide" – To supply, install, connect, and configure, for safe intended normal operation.
 - 4. The terms "Indicated", "shown", or "noted" – As indicated on drawings or specifications.
 - 5. The terms "Equivalent", "similar", or "equal" – equal in materials, size, color, design, and efficiency of specified product, conforming to base bid manufacturer selections.
 - 6. The terms "Reviewed", "satisfactory", "accepted", "approved", "directed" – As reviewed, satisfactory, accepted, approved, or directed by the Owner or Owner's Representative.
 - 7. The term "Professional grade" – Equipment that is intended for commercial use, not residential, use and is rated for continuous 24-7 use.
 - 8. The term "User-friendly controls" – Touch screen graphical user interface (GUI) or other graphical controls that are intuitively configured for ease of use in a logical, easily recognizable, configuration that utilizes industry standard symbols wherever applicable.
 - 9. The term "OFE" refers to items that are Owner Furnished Equipment
 - 10. The term "OFCI" refers to items that are Owner Furnished Contractor Installed Equipment

1.6 REFERENCE STANDARDS, REFERENCE MATERIALS AND/OR CODES

- A. Applicable Codes and Standards:
 - 1. Systems shall be installed in accordance with the latest applicable revisions pertaining to all applicable national, state, and local codes and standards including, but not limited to the following:
 - a. International Building Code / BOCA National Building Code
 - b. Local Governing Authorities Having Jurisdiction
 - c. NFPA-72 National Fire Alarm and Signaling Code
 - d. NFPA-70 National Electric Code (NEC)
 - e. UL Listed- Underwriter's Laboratories Listed

1.7 SCOPE OF WORK REQUIREMENTS

- A. The Contractor shall provide a fully operational Rigging System(s) and Controls.

- B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the Underwriters Laboratories, Inc., local codes, the National Electrical Code and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.
- C. The Contractor shall provide complete and operational system(s) configured and installed for user-friendly operation and low maintenance.
 - 1. Provide for two (2) adjustments of the Theater Rigging System(s), as directed by the Owner's Representative and or Consultant.
- D. On-site factory technical support shall be provided, if necessary, to assure optimized configuration and performance of installed equipment and systems.
- E. The Contractor shall restore all finish hardware to original condition including painting, ceiling modifications, and attachments as specified in Division 09 Finishes. All finishes shall be approved by the Architect and or Owner's Representative.
- F. Installation work shall be in compliance with all Contract Documents, all applicable standards, governing codes, regulations and authorities having jurisdiction.
- G. The Contractor shall validate exact location and installation of the equipment, power, conduit, and raceway systems and coordinate exact location and installation of the equipment, power, conduit, and raceway systems with the Architect and or Owner's Representative.
- H. All finalized software affiliated with the equipment is the property of the Owner and will be provided on labeled CDs or electronic media for archival purposes at project acceptance.
- I. The Contractor shall supply all control software, programming service codes, programming notes, files interactive source codes, all media and associated software, touch panel design, all passwords, licenses, dangles and "keys" or other associated control or programming items at no additional cost to the Owner at commissioning.

1.8 SYSTEM(S) DESCRIPTION AND REQUIREMENTS

- A. The following is a basic system(s) description and is not intended to be all-inclusive for proper installation or operation of system(s). The Theater Lighting specification and the Theater Lighting Bid Set drawings need to be fully reviewed together to ensure design intent and listing of design intent equipment is completely understood.
 - 1. The Bid proposal will include all labor and cabling for all optional / add alternate equipment listed in Rigging and Controls specification and Theater Equipment Bid set drawings. Please list as separate budgetary items.
- B. Cafeteria / Stage
 - 1. Provide and install all necessary equipment for a safe and properly functioning dead hung rigging system over the stage and in the cafeteria as shown on the TE drawings and as noted in this specification.
- C. Production Multi-Media Room
 - 1. Provide and install all necessary equipment for a safe and properly functioning dead hung pipe grid system as shown on the TE drawings and as noted in this specification.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall carefully control handling and installation of all items which are not replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until Final Acceptance.
- B. The Contractor shall, prior to installation, protect exposed surfaces with material which is easily removed without marring finishes.
- A. The Contractor shall, without cost to the Owner/Consultant, replace any products damaged during storage, handling or during installation.

- B. Store all hoist materials under cover. Place components on minimum 4” high wood blocking. Avoid the use of non-vented plastic or canvas shelters.

1.10 SCHEDULING

- A. The Contractor shall submit a schedule to the Owner/Consultant for approval within 10 (ten) working days from notice to proceed. The schedule shall show sequence of work, etc. from time of Notice to Proceed to final sign off. This schedule shall be submitted in Microsoft Project (or similar program) in both paper and electronic format, with submittals.
- B. It is the responsibility of the Contractor to coordinate the installation of the system(s) to be compatible with the work of the other trades. The Contractor shall attend progress meetings and provide continuous on-site project management.
- C. It is the responsibility of the Contractor to arrange with the Owner/Consultant a mutually acceptable time and date(s) for Acceptance Testing, based upon project dates and schedule provided, based upon the dates provided in the Solicitation.
- D. The Contractor shall provide operating personnel with extensive training for each system type and/or room type as outlined in Section 1.8 SYSTEM(S) DESCRIPTION AND REQUIREMENTS.

1.11 PROJECT SCHEDULE

- A. The contractor shall follow Division one for scheduling and RFI procedure.

1.12 BID/TECHNICAL PROPOSALS

- A. The Contractor shall be experienced in the provision of systems similar in complexity to those required for this project and Contractor shall provide documentation demonstrating the below minimum criteria:
 1. The primary business of the Contractor/Installer shall be the installation Theater Rigging systems and controls.
 2. At least three (3) years' experience with the specified equipment and systems.
 3. Experience with at least one project of similar size and complexity as outline in these specifications.
 4. Be an authorized dealer and service facility for the products specified and furnished.
 5. Maintain a technically trained installation crew and service crew for maintenance and installation of the specified system(s).
 6. Final Theater Rigging System(s) configurations shall be approved by the Owner's Representative, Architect and Consultant.
 7. Upon request of the Owner/Consultant, Contractor shall demonstrate that he has:
 - a. Sufficient facilities and equipment for this work.
 - b. Sufficient staff with the appropriate technical expertise and experience for this project.
 8. All Bid proposals shall be valid for ninety (90) days from date received.
 9. Any deviations from specified equipment must be explained in full detail including reasons for any deviations and product comparisons to the originally specified product. Submission of said comparisons does not constitute acceptance of changes and in fact may be declined. If substitutions are rejected/declined, Contractors bid may be rejected for “non-responsiveness” unless a bid has been supplied with “as-specified” equipment.
- B. Provide a list of five (5) references with locations, names of contacts, and contact phone and email information with brief system descriptions and dollar amounts for each reference. References shall be no more than three (3) years old and be of similar size, type, and complexity as the system set forth.

- C. Provide a detailed equipment list in Microsoft Excel format (both hard copy and electronic) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, and Price. This equipment list shall be generated from this document, related project documents and drawings, manufacturer requirements, and RFI responses as applicable.

1.13 PRE-BUILD AND FINAL SUBMITTALS

- A. Provide the following for approval no later than thirty (30) days after Notice to Proceed and prior to commencement of work:
1. A complete list of all products incorporated within the work with all quantities listed. Each product shall be listed with specification section references in Excel format.
 2. Complete functional diagrams of each system required for a complete and operational system with descriptive narratives of any deviations from the specified system design.
 3. All shop drawings defined as required.
- B. Shop Drawings:
1. Shall not be smaller than 24"x36" and shall be sized as appropriate for thorough understanding of system(s).
 2. Shall be scaled appropriately but not less than 1/8" = 1'.
 3. Shall show detailed schematic wiring diagrams showing interconnection of Contractor-provided components and fabricated products, wiring and cabling diagrams depicting cable types, and device designators. Each component shall have a unique designator and use same designator throughout the project.
 4. Shall show location of all equipment and controllers with complete dimensions, wire routing, and cabling.
 5. Shall show all A.C. power outlet locations and terminal strip.
 6. Shall show plans and sections of the building and adjacent grounds with the location of all installed equipment such as racks, consoles, plates/panels, antennas, (etc.).
 7. Shall show full fabrication detail of custom enclosures indicating dimensions, material, finish, and openings for equipment.
 8. Shall provide complete drawings for all fabricated plates and panels. Drawings shall include dimensional locations of components, component type, engraving information, plate color information, and a complete bill of materials for each plate and sample plates per type.
 9. Shall show complete labeling schemes for all cabling and equipment components for project. Include font size and styles along with a sample cable label and equipment label. All labeling shall be consistent within the project scope.
 10. Shall show a complete wire schedule showing source and destination and indicating conduit location and sizing. Provide conduit sizing and layout coordination information.
- C. Submittal Format: (PDF version)
1. Arrange product data in alphanumeric order by system type and room indicate on cut sheet the options provided.
 2. Separate major groupings Use multiple volumes / list of content
 3. Index product data sheets by manufacturer and model or part number.
 4. Each submittal shall include a unique numbering scheme and be numbered in consecutive order.
 5. Reference addendum or change order numbers as applicable.
 6. Reference specification section, part, article, paragraph, and/or drawing reference as applicable.
 7. Provide via pdf, posted to FTP, thumb drive and or CD / DVD ROM.

8. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.
- D. Submittal Format: (Printed Option)
 1. Each submittal shall be in three-ring binders no larger than 3” spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
 2. Arrange product data in alphanumeric order by system type and room.
 3. Separate major groupings with labeled binder tabs.
 4. Index product data sheets by manufacturer and model or part number.
 5. Each submittal shall include a unique numbering scheme and be numbered in consecutive order.
 6. Reference addendum or change order numbers as applicable.
 7. Reference specification section, part, article, paragraph, and/or drawing reference as applicable.
 8. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.

1.14 PROJECT CONDITIONS

- A. Verify conditions on the job site applicable to this work. Notify Owner's Representative / Consultant in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the jobsite which make it impossible to install work as shown on the drawings or detailed in the specifications, recommend solutions and submit drawings showing how the work may be installed as well as an adjusted new schedule to the Consultant and Owner for approval.

1.15 QUALITY ASSURANCE

- A. Provide and maintain an effective Quality Control program and perform sufficient inspections, surveys and tests of all items of work, including those of other trades, to ensure compliance with the contract documents. Furnish appropriate facilities, accurately calibrated instruments and testing devices required to perform the quality control operations and with sufficient work forces to cover the installation operations within the actual installation sequences. Coordinate this work with the quality control requirements of other technical Sections of the Specifications and with requirements of the Contractor and governing authorities having jurisdiction.
- B. Manufacturer Qualifications: All system components shall be furnished by the manufactures of established reputation and experience who shall have produced currently operating Theater Lighting equipment and services. Manufacture shall be able to similar installations rendering satisfactory service.
- C. Bidder Qualifications: The bidder shall furnish in writing to the Owner proof of compliance with the manufacturer's system installation certification program.

1. Hold all legally required state contractor's licenses necessary to accomplish the installation and activation of the described system at the facilities indicated. Contractor shall submit copies of licenses to the Owner prior to the start of work.
2. Have a local office staffed with factory-trained technicians, fully capable of engineering, supervision installation, and system start-up. Providing the Owner training, and servicing hardware and software for systems of similar complexity and function as the system described in this specification.
3. Indicate complete and total compliance with the provisions of this specification by letter, signed by an officer of the corporation, or a principal if other ownership currently exists. This letter shall also clearly identify any exceptions to specification requirements.

1.16 PRE-INSTALLATION MEETING/SCHEDULE

- A. Prior to the start of the work, and at the Owner/Consultant's direction, meet at the project site to review methods and sequence of installation, special details and conditions, standard of workmanship, testing and quality control requirements, job organization and other pertinent topics related to the work. The meeting shall include the Contractor, Contractor's Project Manager, the Owner/Consultant, and the General Contractor. Inspection and testing services (if any) and any other sub-Contractors whose work requires coordination with this work shall be coordinated.

1.17 FINAL INSPECTION AND TESTING / COMMISSIONING

- A. Upon completion of installation and Contractor testing and commissioning (as outlined in Part 3), the Consultant shall perform system(s) inspection and testing (as outlined in Part 3).
- B. To assist the Consultant, the Contractor shall provide a minimum of one person for inspection and two persons for testing who are familiar with all aspects of the specified system(s).
- C. The process of testing the system(s) may necessitate moving and/or adjusting certain components such as stops, software adjustments, control system adjustments.
- D. Testing will include operation of each system and all components. The Contractor will provide required test equipment, tools, and materials required to perform necessary repairs and/or adjustments.
- E. In the event that adjustments or work is required during testing, or to bring the systems into specification, the Contractor shall continue his work until the system(s) are acceptable with no addition to the contract price. If approval is delayed due to defective equipment, and/or failure of equipment or installation that meets the requirements of this specification, the Contractor shall pay for additional time and expenses to the Owner at the rate specified by the Owner.

1.18 WARRANTY

- A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of one (1) year from the date of written acceptance to meet all performance requirements outlined herein. Warranties shall not be pro-rated. For all Owner-provided equipment, include pricing for an initial two-year service contract.

- B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.
- C. The Contractor shall respond with a remedy to a trouble call within twenty-four (24) hours upon receipt of such a call and shall provide a 24-hour service phone number. Downtime for system(s) shall be no longer than a 24-hour period. All replacement parts/components shall be of equal or higher level of service.
- D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.
- E. At least two routine inspections and adjustment visits shall be scheduled for the first year, coordinated with Owner's Representative.
- F. Provide a separate price for an optional yearly service contract for five (5) years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.
- G. The Contractor shall be present at the first use of the system (scheduled by the Owner), and one (1) additional event as requested by the Owner for no additional charge.

1.19 INSTRUCTION OF OWNER PERSONNEL

- A. The training time shall not be less than a total of 4 hours, and shall consist of:
 - 1. Two periods: four (4) hours during normal day shift for system operators. Specific scheduled shall be established at the convenience of the Owner. The four hours shall be broken down into two sections.
 - 2. Two (2) hours of system training shall be provided to Owner supervisory personnel so that they are familiar system operation.
 - 3. Two (2) hours of system maintenance familiarization training shall be provided to Owner's personnel.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Electronic component models shall be commercially available for at least one (1) year prior to bid or be approved by The Owner.
- B. All materials and equipment used in this project shall be new, unused and of the latest design. Refurbished materials shall not be permitted.
- C. All equipment must be UL listed or built to UL standards, where required.

2.2 GENERAL

- A. All equipment shall be professional grade and rated for continuous duty. Basic guidelines have been prepared with manufacturer names, makes, and model numbers included as minimum performance requirements. These must be satisfied, unless a variance (separate document) is submitted and approved by the Owner.
- B. System shall be installed and configured for simplicity of operation, with user-friendly controls.

- C. Product quantity is as required for a complete and operable system. If any quantities are given, Contractor shall provide at least the given amount. Some of the product listed under this section may not be required to fulfill the work as outlined.
- D. Regardless of the length or completeness of the descriptive paragraphs listed herein, each device shall meet published manufacture's specifications.
- E. All turnbuckles, clips, tracks, chains and other items of incidental hardware shall be furnished plated or painted black.
- F. Materials shall conform to appropriate ASTM standard specifications.
- G. In order to establish minimum standards of safety, the following factors shall be used:
 - 1. Cables and fittings-10:1 Safety Factor
 - 2. Cable bending ratio-Minimum sheave diameter per wire rope user's manual
 - 3. Maximum fleet angle-1-1/2 degrees
 - 4. Steel-1/5 of yield
- H. Mule blocks, cable rollers and guides shall be furnished, as required, to provide proper alignment and to maintain specified fleet angles.
- I. Where dimensions and loading capacities have been omitted from this specification, they are to be determined by the Contractor in accordance with accepted industry standards and the guidelines in this section.
- J. The mechanical fabrication and workmanship shall incorporate best practices for good fit and finish. There shall not be any burrs or sharp edges to cause a hazard nor shall there be any sharp corners accessible to users.
- K. Shop and field welding shall be performed by a certified welder and fully meet qualifications of the AISC manual and shall be without spatter or other evidence of poor practices.

2.3 RIGGING

- A. Lighting and Curtain Battens: Fabricate battens from steel pipe with a minimum number of joints. As necessary for required lengths, connect pipe with a drive-fit pipe sleeve not less than 18 inches long, and secure with four flush rivets, plug welds, threaded couplings, or another equally secure method. Shop-paint completed pipe battens with black paint.
- B. Steel Pipe: ASTM A 53/ A 53M, Grade A, standard weight (Schedule 40), black, 1-1/2-inch nominal diameter. All Steel pipe shall have yellow batten end caps a minimum of 4 inches long.
- C. Pipe hanging full clamps: Steel clamps with black powder-coat finish, full clamps have rounded corners, supplied with 3/8" x 1" (9.5 mm x 25.4 mm) hex bolts with lock nuts, and a 5/8" (15.875 mm) hole for attachment of cable, chain, or other fittings, full clamps are 12-gauge (2.65 mm) steel.
- D. Pipe grid clamp: Provides rigid, low profile connections for assembling pipe grids of 1-1/2" schedule 40 pipe, black, powder coated 1/8" steel plates are supplied with 3/8" black Grade 5 bolts and nuts.

- E. S-Hooks: Track manufacturer's heavy-duty plated-wire hooks.
- F. Snap Hooks: Track manufacturer's heavy-duty hooks.
- G. Turnbuckles: Drop forged turnbuckles shall meet the requirements of ASTM F1145-92, Type 1, Grade 1, made in the US
- H. Molded Eye Bolts: Drop forged molded eye bolts properly rated for the load and previously stated safety factor. Bent eye bolts are not acceptable.
- I. Shackles / Clevis: Drop forged anchor shackles shall meet the performance requirement of Federal Specification RR-C-271D type IVA.
- J. Chain Quick Links: shall have a threaded sleeve and be rated for the load and previously stated safety factor.
- K. Supports, Clamps, and Anchors: Sheet steel in manufacturer's standard thicknesses, galvanized after fabrication according to ASTM A 153/A 153M, Class B.
- L. Trim and Support Cable: 1/4-inch-diameter, 7x19 galvanized steel aircraft cable with a breaking strength of 7000 lb. Provide fittings complying with cable manufacturer's printed recommendations for size, number, and method of installation, including a drop-forged galvanized turnbuckle to allow for leveling.
- M. Trim and Support Chain: Grade 80 hardened alloy steel chain rated for overhead lifting, ASTM A 391/A 391M. Appropriate clamping devices or eyebolts shall be used to make connections to support steel or ceiling. (Chain is not to be wrapped around support members.)
- N. Inserts, Bolts, Rivets, and Fasteners: Manufacturer's standard corrosion-resistant units.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. It shall be the responsibility of the Contractor to receive and store the necessary materials and equipment for installation of the rigging system(s) and controls. The contractor shall deliver on a timely basis to other trades any equipment that must be installed during construction.
- B. The Contractor shall be responsible for field measurements and coordinating physical size of all equipment with the architectural requirements of the spaces into which they are to be installed.
- C. The Contractor shall install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations and standards applicable to work.
- D. Installation shall be accomplished by approved Theatrical Equipment Contractor (TEC).
- E. The installed system shall be commissioned by a certified TEC or factory authorized technician.

3.2 CONTRACTOR TESTING AND OR COMISSIONING

- A. Prior to energizing or testing the system(s), ensure the following:
1. All products are installed in a proper and safe manner per the manufacturers' instructions.
 2. Insulation and shrink tubing are present where required.
 3. Dust, debris, solder, splatter, etc. is removed.
 4. Cable is dressed, routed, and labels and all connections are consistent.
 5. All labeling has been provided and installed.
 6. All products are neat, clean, unmarred and securely fastened.
 7. All debris has been cleaned and removed from the site.
 8. All electronic devices are properly grounded.
- B. Before Acceptance Tests are scheduled, the Contractor shall perform their own system check-out. He shall furnish all required test equipment and shall perform all work necessary to determine and / or modify performance of the system to meet the requirements of this specification.
- C. The installed system shall be Tested/Commissioned by a manufacture certified technician.
- D. Testing items:
1. Testing of theater rigging systems shall include but, not be limited to, the following items as applicable to the systems installed:
 - a. Provide documentation that all control signal connections have been tested and verified.
 - b. Provide documentation that all mounting and rigging elements have been verified for structural integrity and safety.
- E. Commissioning shall include but not be limited to:
1. Confirming that all terminations are in accord with the manufacturer's specifications
 2. Testing the operation of each hoist through its full range of travel, setting normal and ultimate limits,
 3. Testing emergency stop and braking functions.
 4. Confirming load sensing for each hoist is set within appropriate ranges.

3.3 CONSULTANT ACCEPTANCE TESTS

- A. Consultant acceptance tests will not be performed until after the contractor's system checkout as outlined above has been completed and the test results have been received and reviewed by the consultant and or owner.
- B. Consultant acceptance testing will be conducted based on the above outlined information and in accordance with the necessary test to show a fully complete, functional, and operating system(s)
- C. Checklist items within this list will be verified by visual and or audible methods as part of normal room use case operational scenarios, with the assumption that the Contractor has fulfilled their obligation to test and ensure that the systems are tested, complete and free of operational defects per manufacture requirements and the above.

- D. The system acceptance tests will be supervised by the consultant and will consist of the verification checklist as well as any additional tests as required:
1. A physical inventory will be taken of all equipment on site and will be compared to equipment lists in the contract documents.
 2. The operation of all system equipment shall be demonstrated by the contractor.
 3. Contractor shall provide a laptop to support testing activities that is configured and ready connect to any and all control equipment for any adjustments that may be required by the consultant.
 4. Both subjective and objective operational tests will be required by the Consultant to determine compliance with the specifications and industry standards. The Contractor shall be responsible for providing all required test equipment based on system complexity and equipment selection / configuration.
 5. Operational use case test scenarios may be conducted based on programmed room uses and functionality.
 6. All final, "as-built" drawings, run sheets, manuals, and other required documents, as detailed in Part I, shall be on hand. Two complete sets of these documents shall be delivered to the Owner at this time. (One complete set shall have been delivered to the Consultant prior to the scheduling of Acceptance Tests).
 7. In the event further adjustment is required, or defective equipment must be repaired or replaced, tests may be suspended or continued at the option of the consultant.
- E. Any charge for additional time incurred by the consultant required for overseeing the system tests, due to improper system installation or previous failed systems, shall be the responsibility of, and charged directly to the contractor and or subcontractor as appropriate.

END OF SECTION

SECTION 11 61 43 – STAGE CURTAINS**PART 1 - GENERAL****1.1 REFERENCE TO OWNER'S GENERAL CONDITIONS**

- A. The Owner's / Project General Conditions shall be considered part of this Specification. Unless this Section contains statements, which are more definitive or more restrictive than those contained in the Owner's General Conditions, this Specification shall not be interpreted as waiving or overruling any requirements expressed in the General Conditions documentation

1.2 SUMMARY

- A. Statement of Work: the work of this section includes, but is not necessarily limited to the following:
1. Provide and install complete and operational Stage Curtain System(s) as outlined in these specifications and related drawings and documentation requirements as set forth in this documentation.
 2. Equipment and systems shall be installed at the Glenridge Middle School located in Prince George's County Maryland.
 3. It is the responsibility of the Contractor to provide all curtains, tracks, stops, equipment, rigging, all support means and miscellaneous equipment for complete and fully operational and properly masking Stage Curtain system(s) if specified in this or other related documents or not.
 4. Included Spaces:
 - a. Stage
- B. Provide for the coordination, provision, installation, inspection, testing, instruction, and warranties of the Stage Curtain system(s).
- C. Provide all materials, equipment, transportation, and necessary labor for a complete, operational and properly masking Stage Curtain system(s).
- D. Additional contractor requirements:
1. Required licenses and/or permits including any required bonding or insurance requirements to comply with general conditions of specifications and contract documentation.
 2. Verification of the dimensions and conditions at the job site.
 3. Installation in accordance with the contract documentation, applicable installation procedures or codes as set forth by the state or county of the project or manufacturers' recommendations.
 4. Submittal information and provisions.
 5. Instruction of operating personnel.
 6. Manuals and provisions thereof.
 7. Maintenance and warranties.

1.3 RELATED DOCUMENTS

- A. General: Comply with all Contract Documents, including, but not limited to, Divisions 0, 1, 11, 26, 27 and the general contract specifications.
- B. Related specification sections:
1. Section 11 61 33 Rigging Systems and Controls
 2. Section 26 55 61 Theater Lighting Systems

3. Section 27 41 13 Projection Screens

1.4 RELATED WORK

- A. Related Work: Equipment and materials provided and installed by others, unless otherwise shown in this Section or the Drawings, shall include but are not limited to:
1. Section 11 61 33 Rigging Systems and Controls

1.5 DEFINITIONS

- A. Regardless of their usage in codes or other industry standards, certain words or phrases as used in the Drawings or Specifications for the Work, shall be understood to have the specific meanings as ascribed to them in the following list:
1. The term "Contractor" – Integrator who has been awarded the contract to perform the work under this section.
 2. The terms "shall" is mandatory, "will" is informative, and "should" is advisory.
 3. "Provide" – To supply, install, connect, and configure, for safe intended normal operation.
 4. The terms "Indicated", "shown", or "noted" – As indicated on drawings or specifications.
 5. The terms "Equivalent", "similar", or "equal" – equal in materials, size, color, design, and efficiency of specified product, conforming to base bid manufacturer selections.
 6. The terms "Reviewed", "satisfactory", "accepted", "approved", "directed" – As reviewed, satisfactory, accepted, approved, or directed by the Owner or Owner's Representative.
 7. The term "Labels" – refer to labels permanently attached to curtains as outlined in Section 3.2 and as required by applicable codes.
 8. The term "OFE" refers to items that are Owner Furnished Equipment
 9. The term "OFCI" refers to items that are Owner Furnished Contractor Installed Equipment
 10. Batten: Steel pipe supporting curtain by means of cables or chains from overhead structural support.
 11. Overlap: Track that extends beyond curtain centerline to ensure closure of bi-parting curtain.
 12. Rigging: General term for hardware used to move scenery, lights, or curtains on or over the stage.
 13. Scrim: Loosely woven fabric curtain that appears opaque when lit from the front and transparent when backlit.
 14. Trim: Adjustment of height or level of curtain or equipment.

1.6 REFERENCE STANDARDS, REFERENCE MATERIALS AND/OR CODES

- A. Applicable Codes and Standards:
1. Systems shall be installed in accordance with the latest applicable revisions pertaining to all applicable national, state, and local codes and standards including, but not limited to the following:
 - a. International Building Code / BOCA National Building Code
 - b. Local Governing Authorities Having Jurisdiction
 - c. All applicable National Fire Protection Association (NFPA) Codes including but not limited to NFPA 701.

1.7 SCOPE OF WORK REQUIREMENTS

- A. The Contractor shall provide rigging capable of withstanding the effects of the design loads and the weight of stage curtains as indicated on the drawings and described and as specified.
- B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the local codes, the National Fire Protection Association and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.
- C. The Contractor shall provide complete and operational system(s) configured and installed for proper masking of the stage, lighting, and rigging systems.
 - 1. Provide for two (2) adjustments of the Stage Curtain system(s), as directed by the Owner's Representative and or Consultant.
- D. The Contractor shall restore all finish hardware to original condition including painting, ceiling modifications, and attachments as specified in Division 09 Finishes. All finishes shall be approved by the Architect and or Owner's Representative.
- E. Installation work shall be in compliance with all Contract Documents, all applicable standards, governing codes, regulations and authorities having jurisdiction.
- F. The Contractor shall validate exact location and installation of the equipment, and coordinate exact location and installation of the equipment, with the Architect and or Owner's Representative.

1.8 SYSTEM(S) DESCRIPTION AND REQUIREMENTS

- A. The following is a basic system(s) description and is not intended to be all-inclusive for proper installation or operation of system(s). The Stage Curtain specification and the Theater Equipment Bid Set drawings need to be fully reviewed together to ensure design intent and listing of design intent equipment is completely understood.
 - 1. The Bid proposal will include all labor and pieces/parts for all optional / add alternate equipment listed in specification and Theater Equipment Bid set drawings. Please list as separate budgetary items.
- B. Fire-Test-Response Characteristics: Provide stage curtains with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or a testing and inspecting agency acceptable to authorities having jurisdiction

1.9 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall carefully control handling and installation of all items which are not replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until Final Acceptance.
- B. The Contractor shall, prior to installation, protect exposed surfaces with material which is easily removed without marring finishes.
- C. The Contractor shall, without cost to the Owner/Consultant, replace any products damaged during storage, handling or during installation.

1.10 SCHEDULING

- A. The Contractor shall submit a schedule to the Owner/Consultant for approval within 10 (ten) working days from notice to proceed. The schedule shall show sequence of work, etc. from time

of Notice to Proceed to final sign off. This schedule shall be submitted in Microsoft Project (or similar program) in both paper and electronic format, with submittals.

- B. It is the responsibility of the Contractor to coordinate the installation of the system(s) to be compatible with the work of the other trades. The Contractor shall attend progress meetings and provide continuous on-site project management.
- C. It is the responsibility of the Contractor to arrange with the Owner/Consultant a mutually acceptable time and date(s) for Acceptance Testing, based upon project dates and schedule provided, based upon the dates provided in the Solicitation.
- D. The Contractor shall provide operating personnel with extensive training for each Curtain and equipment type.

1.11 PROJECT SCHEDULE

- A. A (mandatory) pre-bid site visit on, (DATE) will be utilized to allow the Contractor to review the current jobsite conditions and define special requirements.
- B. All Requests for Information (RFI) shall be directed to the Consultant and should be received by Close of Business (COB) on (DATE).
- C. All bids must be received at the Warrenton office of Polysonics to the attention of the Consultant. All bid proposals (electronic copy) are due to Polysonics no later than (DATE).
- D. Hard copies of the bid proposals will be provided
 - 1. Please submit three hard copies.
- E. The opening of the bid proposals will be held between Polysonics and the Owner's Representative, with no bidder's present.

1.12 BID/TECHNICAL PROPOSALS

- A. The Contractor shall be experienced in the provision of systems similar in complexity to those required for this project and Contractor shall provide documentation demonstrating the below minimum criteria:
 - 1. The primary business of the Contractor/Installer shall be the installation Theater systems.
 - 2. At least three (3) years' experience with the specified equipment and systems.
 - 3. Experience with at least one project of similar size and complexity as outline in these specifications.
 - 4. Be an authorized dealer and service facility for the products specified and furnished.
 - 5. Maintain a technically trained installation crew and service crew for maintenance and installation of the specified system(s).
 - 6. Final Stage Curtain System(s) configurations shall be approved by the Owner's Representative, Architect and Consultant.
 - 7. Upon request of the Owner/Consultant, Contractor shall demonstrate that he has:
 - a. Sufficient facilities and equipment for this work.
 - b. Sufficient staff with the appropriate technical expertise and experience for this project.
 - 8. All Bid proposals shall be valid for ninety (90) days from date received.
 - 9. Any deviations from specified equipment must be explained in full detail including reasons for any deviations and product comparisons to the originally specified product. Submission of said comparisons does not constitute acceptance of changes and in fact may be declined. If substitutions are rejected/declined, Contractors bid may be rejected for "non-responsiveness" unless a bid has been supplied with "as-specified" equipment.

- B. Provide a list of five (5) references with locations, names of contacts, and contact phone and email information with brief system descriptions and dollar amounts for each reference. References shall be no more than three (3) years old and be of similar size, type, and complexity as the system set forth.
- C. Provide a detailed equipment list in Microsoft Excel format (both hard copy and electronic) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, and Price. This equipment list shall be generated from this document, related project documents and drawings, manufacturer requirements, and RFI responses as applicable.

1.13 PRE-BUILD AND FINAL SUBMITTALS

- A. Provide the following for approval no later than thirty (30) days after Notice to Proceed and prior to commencement of work:
 - 1. A complete list of all products incorporated within the work with all quantities listed. Each product shall be listed with specification section references in Excel format.
 - 2. Complete functional diagrams of each system required for a complete and operational system with descriptive narratives of any deviations from the specified system design.
 - 3. All shop drawings defined as required.
- B. Delegated-Design Submittal: For rigging indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Verification: For each type of fabric from dye lot to be used for the Work, with specified treatments applied, and showing complete pattern and texture repeat, if any. Mark top and face of fabric. Prepare Samples of size indicated below.
 - 1. Size: Not less than 12 inches square.
- D. Product Certificates: For each type of product and fabric, signed by product manufacturer.
 - 1. Fabric: Give name of flame-retardant chemical used, identification of applicator, treatment method, application date, allowable life span for treatment, and details of any restrictions and limitations.
 - 2. Rigging: Suspended battens and tracks comply with requirements
- E. Shop Drawings:
 - 1. Shall not be smaller than 24"x36" and shall be sized as appropriate for thorough understanding of system(s).
 - 2. Shall be scaled appropriately but not less than 1/8" = 1'.
 - 3. Shall show detailed Show fabrication and installation details for stage curtains. Include plans, elevations, sections, details, attachments to other work
 - 4. Shall show operating clearances.
 - 5. Shall show detailed requirements for supporting curtains, track, and equipment.
 - a. Verify capacity of each track and rigging component to support loads.
 - 6. Shall provide complete drawings for all fabricated pieces/parts. Drawings shall include dimensional locations of components, component type.
- F. Submittal Format: (PDF version)
 - 1. Arrange product data in alphanumeric order by system type and room indicate on cut sheet the options provided.
 - 2. Separate major groupings Use multiple volumes / list of content
 - 3. Index product data sheets by manufacturer and model or part number.
 - 4. Each submittal shall include a unique numbering scheme and be numbered in consecutive order.

5. Reference addendum or change order numbers as applicable.
6. Reference specification section, part, article, paragraph, and/or drawing reference as applicable.
7. Provide via pdf, posted to FTP, thumb drive and or CD / DVD ROM.
8. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.

G. Submittal Format: (Printed Option)

1. Each submittal shall be in three-ring binders no larger than 3” spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
2. Arrange product data in alphanumeric order by system type and room.
3. Separate major groupings with labeled binder tabs.
4. Index product data sheets by manufacturer and model or part number.
5. Each submittal shall include a unique numbering scheme and be numbered in consecutive order.
6. Reference addendum or change order numbers as applicable.
7. Reference specification section, part, article, paragraph, and/or drawing reference as applicable.
8. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.

1.14 PROJECT CONDITIONS

- A. Verify conditions on the job site applicable to this work. Notify Owner's Representative / Consultant in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the jobsite which make it impossible to install work as shown on the drawings or detailed in the specifications, recommend solutions and submit drawings showing how the work may be installed as well as an adjusted new schedule to the Consultant and Owner for approval.

1.15 QUALITY ASSURANCE

- A. Provide and maintain an effective Quality Control program and perform sufficient inspections, surveys and tests of all items of work, including those of other trades, to ensure compliance with the contract documents. Furnish appropriate facilities, accurately calibrated instruments and testing devices required to perform the quality control operations and with sufficient work forces to cover the installation operations within the actual installation sequences. Coordinate this work with the quality control requirements of other technical Sections of the Specifications and with requirements of the Contractor and governing authorities having jurisdiction.
- B. Manufacturer Qualifications: All system components shall be furnished by the manufactures of established reputation and experience who shall have produced currently operating theater curtains, rigging equipment and services. Manufacture shall be able to similar installations rendering satisfactory service.
- C. Bidder Qualifications: The bidder shall furnish in writing to the Owner proof of compliance with the manufacturer's system installation certification program.

1. Hold all legally required state contractor's licenses necessary to accomplish the installation and activation of the described system at the facilities indicated. Contractor shall submit copies of licenses to the Owner prior to the start of work.
2. Have a local office staffed with factory-trained technicians, fully capable of engineering, and supervision installation. Providing the Owner training, and servicing hardware for systems of similar complexity and function as the system described in this specification.
3. Indicate complete and total compliance with the provisions of this specification by letter, signed by an officer of the corporation, or a principal if other ownership currently exists. This letter shall also clearly identify any exceptions to specification requirements.

1.16 PRE-INSTALLATION MEETING/SCHEDULE

- A. Prior to the start of the work, and at the Owner/Consultant's direction, meet at the project site to review methods and sequence of installation, special details and conditions, standard of workmanship, testing and quality control requirements, job organization and other pertinent topics related to the work. The meeting shall include the Contractor, Contractor's Project Manager, the Owner/Consultant, and the General Contractor. Inspection and testing services (if any) and any other sub-Contractors whose work requires coordination with this work shall be coordinated.

1.17 FINAL INSPECTION AND TESTING / COMMISSIONING

- A. Upon completion of installation and Contractor testing and commissioning (as outlined in Part 3), the Consultant shall perform system(s) inspection and testing (as outlined in Part 3).
- B. To assist the Consultant, the Contractor shall provide a minimum of one person for inspection and two persons for testing who are familiar with all aspects of the specified system(s).
- C. The process of testing the system(s) may necessitate moving and/or adjusting certain components such as curtain trim height.
- D. Testing will include operation of each system and all components. The Contractor will provide required test equipment, tools, and materials required to perform necessary repairs and/or adjustments.
- E. In the event that adjustments or work is required during testing, or to bring the systems into specification, the Contractor shall continue his work until the system(s) are acceptable with no addition to the contract price. If approval is delayed due to defective equipment, and/or failure of equipment or installation that meets the requirements of this specification, the Contractor shall pay for additional time and expenses to the Owner at the rate specified by the Owner.

1.18 WARRANTY

- A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of two (2) years from the date of written acceptance to meet all performance requirements outlined herein. Warranties shall not be pro-rated. For all Owner-provided equipment, include pricing for an initial two-year service contract.
- B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.
- C. The Contractor shall respond with a remedy to a trouble call within twenty-four (24) hours upon receipt of such a call and shall provide a 24-hour service phone number. Downtime for system(s) shall be no longer than a 24-hour period. All replacement parts/components shall be of equal or higher level of service.

- D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.
- E. At least two routine inspections and adjustment visits shall be scheduled for the first year, coordinated with Owner's Representative.
- F. Provide a separate price for an optional yearly service contract for five (5) years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.

1.19 INSTRUCTION OF OWNER PERSONNEL

- A. The training time shall not be less than a total of 4 hours, and shall consist of:
 - 1. System training shall be provided to Owner's personnel so that they are familiar system operation all moving parts, proper storage with currants are not in use, proper care of curtains, rigging and track and how to complete routine inspections.
 - 2. System maintenance training shall be provided to Owner's personnel including proper care and cleaning instructions for each fabric type.

PART 2 - PRODUCTS

2.1 CURTAIN SCHEDULE

See drawings for schedule

2.2 CURTAIN FABRICS

- A. General: Provide fabrics inherently and permanently flame resistant to comply with requirements indicated. Provide fabrics from the same dye lot.
- B. Polyester Velour: Napped fabric of 100 percent polyester weighing not less than 23 oz./linear yard, with pile height approximately 75 mils; inherently and permanently flame resistant; 54-inch minimum width.
 - 1. Basis-of-Design Products: Provide KM Fabric, Inc. or an approved equivalent from the listed manufacturer. Refer to Interior Color Schedule on Plan Drawing for the indicated KM Fabric, Inc. patterns and colors. Manufacturer indicated will be acceptable subject to exactly matching the selected patterns and colors indicated in the Color Schedule.
 - a. J. L. de Ball America, Inc.
 - 2. Colors, Textures, and Patterns: Refer to Color Schedule on Plan Drawings.
- C. Lining: Yarn-dyed denim cloth of 100 percent cotton; woven in a warp-faced twill; 54-inch minimum width.
- D. Polyester: Woven fabric of 100 percent polyester yarn weighing not less than 13 oz./linear yard; inherently and permanently flame resistant; 54-inch minimum width.
- E. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Dazian; PD Cloth.
 - 2. Frankel Associates, Inc.; Cyc-Clone.
 - 3. Rose Brand; Cyc Cloth.
 - 4. Valley Forge Fabrics, Inc.; Wiz Key.
- F. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range.
- G. Muslin: Sheer, plain-woven fabric.
 - 1. Fabric: 100 percent polyester weighing not less than 11.75 oz./linear yard; inherently and permanently flame resistant; 106-inch minimum width.

2. Color: As selected by Architect from manufacturer's full range.

2.3 CURTAIN FABRICATION

- A. General: Affix permanent label, stating compliance with requirements of authorities having jurisdiction, in accessible location on curtain not visible to audience. Provide vertical seams, unless otherwise indicated. Arrange vertical seams so they do not fall on faces of pleats. Do not use fabric cuts less than one-half width.
 1. Vertical Hems: Provide vertical hems not less than 2 inches wide, and not less than 4 inches wide at borders, valance, and tormentors, with not less than a 1-inch tuck, and machine-sewn with no selvage material visible from front or the rear of curtain. Sew all open ends of hems closed.
 2. Leading Edge Turnbacks: Provide turnbacks formed by folding not less than 12 inches of face fabric back, with not less than a 1-inch tuck, and secured by sewing turnbacks vertically.
 3. Top Hems: Reinforce top hems by double-stitching 3-1/2-inch-wide, heavy jute webbing to top edge with not less than 2 inches of face fabric turned under.
 4. Pleats: Provide 50 percent fullness in curtains, exclusive of turnbacks and hems, by sewing additional material into 3-inch double-stitched box pleats spaced at 12 inches o.c. along top hem reinforcement.
 5. Grommets: Brass, No. 3, centered on each box pleat and 1 inch from corner of curtain, for snaps or S-hooks.
 - a. For black curtains, provide brass or aluminum grommets with black finish.
 6. Bottom Hems:
 - a. For curtains that do not hang to the floor, provide hems not less than 3 inches deep with 3/4-inch weight tape.
 - b. For floor-length curtains, provide hems not less than 6 inches deep with 1-inch weight tape. Sew open ends of hems closed.
 - c. For floor-length curtains, provide hems not less than 6 inches deep with separate, interior, 100 percent cotton, heavy canvas chain pocket equipped with proof coil chain. Stitch chain pockets so chain will ride 2 inches above finished bottom edge of curtain.
 - 1) Proof Coil Chain: Grade 30, No. 8, zinc plated, 3/16 inch, ASTM A 413/A 413M.
 7. Velour Curtains: Fabricate with the fabric nap down.
 8. Lining: Provide lining for each curtain in same fullness as face fabric and finished 2 inches shorter than face fabric. Attach lining to face fabric along bottom and side seams with 4-inch-long strips of heavy woven cotton tape.
- B. Sky Drop: Fabricate from muslin fabric, sewn flat with either horizontal or vertical seams to suit Project, and selvage to the rear. Provide 6-inch pipe pocket at bottom with a 6-inch flap of same fabric in front of pocket. Provide double-stitched, 3-1/2-inch jute webbing at top with not less than No. 2 brass grommets spaced at 12 inches o.c. and 1 inch from corner of curtain. Provide not less than a 2-inch double-folded side hem and a 4-inch bottom hem.
- C. Tie Lines: Braided soft cotton, black or white to best match curtain; not less than 5/8-inch-wide by 36 inches long.

2.4 RIGGING

- A. Curtain Battens: Fabricate battens from steel pipe with a minimum number of joints. As necessary for required lengths, connect pipe with a drive-fit pipe sleeve not less than 18 inches

long, and secure with four flush rivets, plug welds, threaded couplings, or another equally secure method. Shop-paint completed pipe battens with black paint.

- B. Steel Pipe: ASTM A 53/ A 53M, Grade A, standard weight (Schedule 40), black, 1-1/2-inch nominal diameter. All Steel pipe shall have yellow batten end caps a minimum of 4 inches long.
- C. S-Hooks: Track manufacturer's heavy-duty plated-wire hooks.
- D. Snap Hooks: Track manufacturer's heavy-duty hooks.
- E. Supports, Clamps, and Anchors: Sheet steel in manufacturer's standard thicknesses, galvanized after fabrication according to ASTM A 153/A 153M, ClassB.
- F. Trim and Support Cable: 1/4-inch-diameter, 7x19 galvanized steel aircraft cable with a breaking strength of 7000 lb. Provide fittings complying with cable manufacturer's printed recommendations for size, number, and method of installation, including a drop-forged galvanized turnbuckle to allow for leveling.
- G. Trim and Support Chain: Grade 80 hardened alloy steel chain rated for overhead lifting, ASTM A 391/A 391M. Appropriate clamping devices or eyebolts shall be used to make connections to support steel or ceiling. (Chain is not to be wrapped around support members.)
- H. Inserts, Bolts, Rivets, and Fasteners: Manufacturer's standard corrosion-resistant units.
- I. Steel Track: Fabricate of roll-formed, galvanized, commercial-quality, zinc-coated steel sheet; complying with ASTM A 653/A 653M, G60 (Z180) coating designation, with continuous bottom slot, and with each half of track in one continuous piece.
- J. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Automatic Devices Company.
 - 2. H & H Specialties Inc., design standard.
 - a. Curtains over 18' tall shall utilize H&H Specialties 400 series track and components or pre-approved equal.
 - b. Curtains under 18' tall shall utilize H&H Specialties 100 series track with 200 series components or pre-approved equals.
 - c. Lightweight curtains shall utilize H&H Specialties 116 series track and components or pre-approved equals.
 - d. Curved curtains shall utilize H&H Specialties 300 series track and components or pre-approved equal.
 - e. Provide appropriately sized Rotodrapeer/Pivot Device for all leg curtains.
- K. Minimum Base-Metal Thickness: Not less than 0.0677 inch.

2.5 STEEL-CURTAIN-TRACK FABRICATION

- A. Medium-Duty Track System: Equip track with adjustable, single- and double-end pulley and floor blocks containing guarded ball-bearing wheels. Provide single curtain carriers of plated steel with a pair of nylon wheels riveted parallel to body. Provide one master carrier, for each leading curtain edge, of plated steel with two pairs of nylon wheels and with two-line clamps per carrier. Equip carriers with plated-steel swivel eye for attaching curtain snap or S-hook. Provide end stops for track and an adjustable floor block designed for maintaining proper tension on 1/4-inch stretch-resistant operating cord consisting of braided synthetic-fiber jacket over solid, synthetic-fiber, linear, center filaments.
 - 1. Operating Line: Manufacturer's standard 3/8-inch stretch-resistant operating cord consisting of braided synthetic-fiber jacket over solid, synthetic-fiber, linear, center filaments.

2. Operating Line: Manufacturer's standard 3/16-inch stretch-resistant operating cable consisting of braided synthetic-fiber jacket over galvanized wire-center cable.
3. Track Lap Clamp: Metal to match track channel for attaching double-sectioned track at center overlap.
4. Curtain Carriers: For track spaced at 12 inches o.c.
5. Fold Guide: Equip carriers with rear-fold or backpack guide and rubber spacers to permit offstage curtain folding, sized for use with operating line if any.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. It shall be the responsibility of the Contractor to receive and store the necessary materials and equipment for installation of the curtain system. The contractor shall deliver on a timely basis to other trades any equipment that must be installed during construction.
- B. The Contractor shall be responsible for field measurements and coordinating physical size of all equipment with the architectural requirements of the spaces into which they are to be installed.
- C. Examine areas and conditions, with Installer present, for compliance with requirements for supporting members, blocking, installation tolerances, clearances, and other conditions affecting performance of stage-curtain work. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Examine inserts, clips, blocking, or other supports required to be installed by others to support tracks and battens. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. All equipment shall be installed under the direct supervision of an experienced representative of the rigging contractor.
- F. Contractor shall coordinate (if applicable) installation of curtain system with the theatrical rigging contractor for utilization of the Line Shaft Hoist system as specified. Contractor shall be responsible for supplying all components for a completely operational and properly masking curtain system.
- G. Installation, General
 1. Install stage-curtain system according to approved shop and installation drawings.
- H. Batten Installation
 1. Install battens by suspending at heights indicated with trim and support cable or chain spaced to support load, but do not exceed 10 feet o.c.
 - a. Cable: Secure cables either directly to structures or to inserts, eye screws, or other devices that are secure and appropriate to substrate and that will not deteriorate or fail with age or elevated temperatures. Attach other cable end to pipe clamps with turnbuckles, moused or fixed with nuts after adjustment, to prevent loosening.
 - b. Chain: Secure chain with load-rated terminations.
- I. Track Installation
 1. Beam-Mounted Tracks: Install tracks by suspending from manufacturer's special beam clamps securely mounted to I-beam structure at spacing indicated on approved shop drawings.

2. Wall-Mounted Tracks: Install tracks by suspending from manufacturer's special bracket clamps securely mounted to wall construction at spacing, indicated on approved shop drawings.
3. Batten-Hung Tracks: Install track by suspending from pipe batten with manufacturer's track clamp hangers attached to batten pipe clamps at spacing, indicated on approved shop drawings.
4. Spacing: Do not exceed the following dimensions between supports:
 - a. Medium-Duty Track: 48 inches.
 - b. Curved Walk-Along Track: 48 inches. Provide additional supports at curves and splices.
5. Install track for center-parting curtains with not less than 24-inch overlap of track sections at center, supported by special lap clamps.

J. Curtain Installation

1. Track Hung: Secure curtains to track carriers with track manufacturer's special heavy-duty S-hooks or snap hooks.
2. Batten Hung: Secure curtains to pipe battens with trim and support cable tie lines or chains.

3.2 LABELING

- A. Permanently attach label to each fabric of curtain assembly indicating whether fabric is inherently and permanently flame resistant or treated with flame-retardant chemicals, and whether it will require retreatment after designated time period or cleaning.

3.3 CONTRACTOR TESTING AND OR COMMISSIONING

- A. Before Acceptance Tests are scheduled, the Contractor shall perform their own system check-out. He shall furnish all required test equipment and shall perform all work necessary to determine and / or modify performance of the system to meet the requirements of this specification.

B. Testing items:

1. Testing of Curtain systems shall include but, not be limited to, the following items as applicable to the systems installed:
 - a. Provide documentation that all mounting and rigging elements have been verified for structural integrity and safety.
2. All products are installed in a proper and safe manner per the manufacturers' instructions.
3. Dust, debris, splatter, etc. is removed.
4. All labeling has been provided and installed.
5. All products are neat, clean, unmarred and securely fastened.
6. All debris has been cleaned and removed from the site.

3.4 CONSULTANT ACCEPTANCE TESTS

- A. Consultant acceptance tests will not be performed until after the contractor's system checkout as outlined above has been completed and the test results have been received and reviewed by the consultant and or owner.
- B. Consultant acceptance testing will be conducted based on the above outlined information and in accordance with the necessary test to show a fully complete, functional, and operating system(s)

- C. Checklist items within this list will be verified by visual and or audible methods as part of normal room use case operational scenarios, with the assumption that the Contractor has fulfilled their obligation to test and ensure that the systems are tested, complete and free of operational defects per manufacture requirements and the above.
- D. The system acceptance tests will be supervised by the consultant and will consist of the verification checklist as well as any additional tests as required:
1. A physical inventory will be taken of all equipment on site and will be compared to equipment lists in the contract documents.
 2. The operation of all system equipment shall be demonstrated by the contractor.
 3. Both subjective and objective operational tests will be required by the Consultant to determine compliance with the specifications and industry standards. The Contractor shall be responsible for providing all required test equipment based on system complexity and equipment selection / configuration.
 4. Operational use case test scenarios may be conducted at the consultant's discretion.
 5. All final, "as-built" drawings, run sheets, manuals, and other required documents, as detailed in Part I, shall be on hand. Two complete sets of these documents shall be delivered to the Owner at this time. (One complete set shall have been delivered to the Consultant prior to the scheduling of Acceptance Tests).
 6. In the event further adjustment is required, or defective equipment must be repaired or replaced, tests may be suspended or continued at the option of the consultant.
- E. Any charge for additional time incurred by the consultant required for overseeing the system tests, due to improper system installation or previous failed systems, shall be the responsibility of, and charged directly to the contractor and or subcontractor as appropriate.

END OF SECTION

SECTION 11 66 23 - GYMNASIUM EQUIPMENT**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following gymnasium equipment:
 - 1. Basketball equipment.
 - 2. Safety pads.
 - 3. Floor sleeves for pipe standards.
- B. Related Sections include the following:
 - 1. Division 11 Section "Gymnasium Dividers."
 - 2. Division 26 Electrical.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, attachments to other work, and the following:
- C. Structural analysis data signed and sealed by the qualified professional engineer registered in the State of Maryland responsible for their preparation including loads, point reactions, and locations for attachment of gymnasium equipment to structure.
- D. Samples for Initial Selection: For each type of gymnasium equipment indicated.
- E. Samples for Verification: For the following products:
 - 1. Pad Fabric: Not less than 3 inches square, with specified treatments applied. Mark face of material.
- F. Qualification Data: For Installer and professional engineer.
- G. Operation and Maintenance Data: For gymnasium equipment to include in emergency, operation, and maintenance manuals.
- H. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of gymnasium equipment through one source from a single manufacturer.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install gymnasium equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Verify position and elevation of floor inserts and layout for gymnasium equipment.

1.5 COORDINATION

- A. Coordinate layout and installation of overhead-supported gymnasium equipment and suspension system components with other construction including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of gymnasium equipment that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Basketball backboard failures including glass breakage.
 - 2. Warranty Period: Five years (unless otherwise specified) from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Performance Sports Systems.
- B. Porter Equipment Company.
- C. Draper.

2.2 MATERIALS

- A. Equipment Wall-Mounting Board: Wood, neutral-color painted finish, size, and quantity as required to mount gymnasium equipment according to manufacturer's written instructions.
- B. Anchors, Fasteners, Fittings and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed; tamperproof, vandal- and theft-resistant design.

2.3 BASKETBALL EQUIPMENT

- A. Ceiling Suspended Forward Fold Backstops:
 - 1. Basis-of-Design: Model No. 3107 "Single Post" ceiling suspended, forward fold, front braced backstop as manufactured by Performance Sports Systems, Noblesville, Indiana.
 - 2. "Single Post" vertical main mast assembly shall be constructed of 6-5/8" O.D. (.120" wall ASTM A-500 Grade B) structural steel tubing with diagonal side sway braces of 2 1/2" X 1 1/2" X14 gauge ASTM A-513 rectangular steel tube sway braces miter cut and welded in place to a top horizontal 4" x 1 1/2" x 0.18" web ASTM A-36 steel channel. Sway braces shall attach to mast above backboard for maximum rigidity. Mast and sway braces shall be welded for ceiling heights up to thirty (30) feet. Mast and sway braces shall be clamped for ceiling heights over thirty (30) feet (Model 3106). Backstop shall be front braced and fold forward. Front brace assembly shall have a fully adjustable folding knee joint allowing for exact playing position and maintenance free operation.
 - 3. Goal shall be mounted directly through backboard into a heavy structural steel weldment which shall be clamped to vertical 6-5/8" O.D. center mast. (This direct attachment feature transfers the load on the goal directly to the mast pipe minimizing stress to glass backboard). Goal and backboard mounting design shall conform to NCAA, NFSHSA and FIBA regulations.
 - 4. The all-welded "Single Post" design shall be suspended from custom adjustable hangers with bronze bushings designed to be offset no less than 4" behind the center line of gravity of mast, providing for proper weighting of the assembly and insuring that unit locks securely and automatically into playing position.
 - 5. Backstop shall be supported from 3-1/2" O.D. pipe anchored to roof framing members by means of heavy formed steel support fittings. Superstructure pipes to be reinforced with special bridging or bracing when truss centers exceed spans of fourteen (14) feet. Each attachment clamp must be capable of supporting static loads of at least 10,000 lbs. with no deflection.

6. All metal parts shall have factory applied powder coat finish; color white.
 7. Folding Method: Electric Winch.
- B. Rectangular Glass Backboards - All Backboards:
1. Basis-of-Design: Model No. AFRG42 Aluminum Framed Rectangular Glass Backboard by Performance Sports Systems, Noblesville, IN.
 2. Backboards shall be 42 inches high by 72 inches wide.
 3. Backboard shall be manufactured from 1/2" tempered glass set in heavy extruded aluminum framing and cushioned by shock absorbing vinyl. Official border and target area permanently fired into glass.
 4. Goal mounting structure shall be a heavy welded formed steel assembly, and directly attached to lower horizontal frame member to minimize stress on glass.
 5. Backboard shall have limited lifetime warranty against defects in material and workmanship, and when used with Performance Sports System's Direct Goal Attachment feature shall be protected against shatter and breakage of glass. Board must meet NCAA, FIBA and NFSHSA specifications.
- C. Backboard Padding Kit - Glass Backboards:
1. Basis-of-Design: Model No. CE or NCE Adhered Backboard Padding by Performance Sports Systems, Noblesville, IN.
 2. Pad consists of two pieces with molded type square corners.
 3. Pads molded from Polyurethane Foam (minimum 9 pound density) with integral skin (self-skinning).
 4. Provide a glue or peel and stick tape type attachment.
 5. Pad meets all competition requirements of the NBA, NCAA, NFSHSA, and international requirements of FIBA.
 6. Color to be selected.
- D. Basketball Goal - All Backboards:
1. Basis-of-Design: Model No. 2000+ Breakaway Goal as manufactured by Performance Sports Systems, Noblesville, IN.
 2. Goal shall be fabricated from 5/8" diameter cold drawn alloy steel round formed to an 18" inside diameter ring. Inside of ring shall be positioned 6" from face of backboard by heavy, formed steel hinged-type housing with removable cover to conceal mounting bolts and shock absorption mechanism of goal and to protect against finger entrapment.
 3. Goal shall be designed to absorb shock loads from slam dunking or hanging on rim. Shock absorption feature shall be provided by means of a special offset hinge arrangement rim and back plate mounting housing with concealed molded rubber shock absorber.
 4. Goal shall meet NCAA, FIBA and NFSHSA specification on moveable rims, which states, "A moveable basket ring shall have rebound characteristics identical to those of a non-moveable ring." Goal shall be factory set to proper flex and rebound requirements.
 5. Goal shall be finished in durable, electrostatic powder coated official orange finish.
 6. Goal shall be furnished complete with heavy-duty white anti-whip nylon netting and mounting hardware.
- E. Electric Winch - All Backstops:
1. Basis-of-Design: Model No. 1194 Electric Backstop Winch by Performance Sports Systems, Noblesville, IN.
 2. Electric winch shall be a definite purpose electric winch designed specifically for use of basketball backstop positioning. Winch shall be worm gear type designed to hold backstop at any position during operation. Winch will be driven by a 3/4 HP, 120-volt, 60 hertz, single-phase instant reversing electric motor with thermal overload protection (governed

- to stall at 14 amps to prevent overload) and manufactured to NEMA specifications. Winch shall develop over 1000 lbs. of line pull at a speed of nine (9) feet per minute.
3. Winch shall have high-speed worm gearing to support both radial and thrust loads, and positive locking double reduction gear drive providing 200:1 reduction rate for strong cable hold under load, eliminating need for special brakes. Sealed gear case for lifetime maintenance free operation.
 4. Winch shall incorporate a large 4-1/2" diameter grooved drum to assure long cable life and proper coiling, with a tension roller for correct cable tracking even in slack conditions. Drum shall be grooved for 1/4" 7 x 19 galvanized aircraft cable to facilitate smooth take-up and proper spooling of cable. Drum shall allow 25 feet of travel on one (1) layer and 40 feet on two (2) layers.
 5. Operation:
 - a. Winch shall utilize a flush mounted single keyed switch to both raise and lower backstop. Key switch shall be located so that the backstop is in full view of authorized operator at all times.
 6. Winch shall have five (5) year warranty against material defects and workmanship. Winches with less than a five (5) year warranty shall not be considered equal.
- F. Backstop Auto Lock Safety Strap:
1. Basis-of-Design: Model No. 1100 Safstop safety strap by Performance Sports Systems, Noblesville, IN.
 2. Provide one for each backstop.
 3. Safety strap shall be inertia sensitive to automatically lock basketball backstop in position at any time (in storage or during raising or lowering cycle) due to any sudden surge of speed created by possible malfunction(s) of hoisting apparatus, winch, cable, pulleys, support fittings, etc.
 4. Safety strap shall incorporate a two (2) inch wide nylon belt rated at 6,000 lbs. breaking strength. Entire unit to be tested to withstand 1,500 lb. free fall load and rated at 1000 lbs. Strap shall extend a maximum of 35'-0" and shall be automatically retracted and stored on a reel equipped with a special negator type constant force spring. Operation and locking action of strap shall be set by inertial force for immediate and positive setting, or centrifugal force to instantly lock basketball backstop before unit can gain momentum. Unit shall incorporate a fully automatic reset requiring no poles, ropes, levers or buttons.
 5. Safety strap shall be furnished with universal mounting bracket to fit 3-1/2" O.D. pipe mounted either parallel or at right angles to backboard. Belt shall be supplied with an auto-lock belt clamp for ease of securing directly to basketball backstop.
- G. Manual Basketball Backstop Height Adjuster - All Backstops:
1. Basis-of-Design: Model No. 1130 Manual Adjust-A-Goal by Performance Sports Systems, Noblesville, IN.
 2. Height adjuster shall be manufactured of steel using an Acme threaded screw rod with awning type hand crank to raise and lower backboard. Height adjuster shall be screw driven to raise and lower goal height from 8' to 10' off of finished floor. Screw drive shall be a 3/4" Acme double-start threaded rod secured in two bronze bushings. Height adjuster shall be operated from floor by hand crank (included with height adjuster). Height adjuster to mount directly to goal attachment to transfer load of play directly through backboard to support structure.

2.4 SAFETY PADS

- A. Basis-of-Design; Model No. 4120 Wall Padding as manufactured by Performance Sports Systems, Noblesville, IN.
1. Panels 2 feet wide x 6 feet high.

2. Construct panels of 6 pound density bonded urethane foam filler cemented to 7/16 inch OSB backing board and covered with 14 ounce vinyl laminated material which shall be mildew and rot-resistant, and fortified with an infection combating fungicide and shall be stapled securely to back of plywood; cover material tear strength of 100 psi.
 - a. No added urea formaldehyde for plywood and laminating adhesive.
3. Provide 1 inch nailing margin at top and bottom.
4. Cutouts in panels shall be made in field to fit job conditions.
5. Color: As selected by Architect from manufacturers full range of colors.

2.5 FLOOR SLEEVES FOR PIPE STANDARDS

- A. Floor Sleeves with Chrome Covers: Senoh Floor Plate and Sleeve KA25 (for Volleyball) and KA45 (for Badminton). Provide coverplates from Senoh to coordinate with floor plates.
 1. Comparable products of other named manufacturers may be reviewed with Owner for compatibility with their equipment.
- B. Cover plate consists of molded plastic recessed mounting flange, cork gasket and a 5-inch diameter chrome plated cover.
- C. Cover shall be equipped with a swivel type retainer pin to prevent theft.
- D. Special key shall be provided for cover removal.
- E. Sleeve shall be 3-3/4 inch O.D. heavy wall steel tubing extending 9 inches into concrete footing.
- F. Bottom of sleeve to be capped with a 4-inch square anchor plate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for play court layout, alignment of mounting substrates, installation tolerances, operational clearances and other conditions affecting performance.
 1. Verify critical dimensions.
 2. Examine supporting structure.
 3. Examine wall assemblies, where reinforced to receive anchors and fasteners, to verify that locations of concealed reinforcements have been clearly marked. Locate reinforcements and mark locations.
 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written installation instructions. Complete equipment field assembly, where required.
- B. Unless otherwise indicated, install gymnasium equipment after other finishing operations, including painting, have been completed.
- C. Permanently Placed Gymnasium Equipment and Components: Rigid, level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated on Shop Drawings; in proper relation to adjacent construction; and aligned with court layout.
 1. Operating Gymnasium Equipment: Verify clearances for movable components of gymnasium equipment throughout entire range of operation and for access to operating components.
- D. Wall Safety Pads: Mount with bottom edge at 4 inches above finished floor.

- E. Anchoring to In-Place Construction: Use anchors and fasteners where necessary for securing built-in and permanently placed gymnasium equipment to structural support and for properly transferring load to in-place construction.

3.3 ADJUSTING

- A. Adjust movable components of gymnasium equipment to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.

3.4 CLEANING

- A. After completing gymnasium equipment installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.
- B. Replace gymnasium equipment and finishes that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gymnasium equipment. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 11 66 43 - BASKETBALL SCOREBOARD**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Single-sided LED basketball scoreboard.
- B. Related Sections include the following:
 - 1. Division 11 Section "Basketball Shot Timer Scoreboard."

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's product illustrations, data, and literature that fully describe the scoreboards and accessories proposed for installation.
- B. Shop Drawings: Show installation details including wiring diagrams.
- C. Operation and Maintenance Data: To include in operation and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Submittals."
- D. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of scoring equipment specified in this section and other sections through one source from a single manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- C. Regulatory Requirements: Fabricate and label shot timer scoreboard to comply with the following:
 - 1. ETL listed to UL Standards 48 and 1433.
 - 2. NEC compliant.
 - 3. FCC compliant.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store scoreboard and equipment in a clean, dry environment.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Shop Drawings.
- B. Environmental Limitations: Do not install scoring equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for project when occupied for its intended use.
- C. Supply weight and mounting method to verify that building structure is capable of supporting the scoreboard's weight in addition to the auxiliary equipment.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of shot timer scoreboards that fail in materials or workmanship within specified warranty period.
 - 1. Faulty operation of equipment.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- B. Warranty Period: 5 years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Provide an exchange program to supply replacement parts for components that fail during the coverage period. To minimize downtime, the exchange parts shall be shipped on the same day the order is received or on the following day. The manufacturer will also enclose an air bill for return of the defective components.
- B. Provide access to a local authorized service company.
- C. Provide a help desk staffed by experience technicians and coordinators who are thoroughly familiar with the scoreboard and available for technical support. The staff must be available at no additional cost to the customer and provide an "on-call" service during weekends.

PART 2 PRODUCTS

2.1 SCOREBOARD

- A. Basis-of-Design Product: The design for scoreboard is based on Daktronics, Inc. Model BB-2125-13; Single-sided LED Basketball Scoreboard.
- B. Provide the basis-of-design, or comparable models from one of the following acceptable manufacturers:
 - 1. Nevco.
 - 2. Sportable Scoreboards.
- C. General: Single-sided basketball scoreboard that also scores volleyball and wrestling. It scores HOME and GUEST to 199, PERIOD to nine, indicates possession and bonus, displays period time to 99:59 and during the last minute of the period, it displays time to 1/10 of a second.
 - 1. Dimensions: Refer to Drawings.
 - 2. Weight: 120 lbs.
 - 3. Power Requirements: 200 W.
 - 4. Color: To be selected by Architect from minimum 100 colors.
- D. Construction: Aluminum cabinet capable of withstanding high-velocity impact from indoor sports balls without the need for protective screens, as follows:
 - 1. Face and Perimeter: 0.063 inch thick.
 - 2. Back: 0.050 inch thick.
 - 3. Digit Faceplates: 0.063 inch thick.
- E. Digits:
 - 1. PanaView (PV) LED digits.
 - 2. Seven bar segments per digit.
 - 4. Clock and Score Digits: 13 inches high.
 - 5. PERIOD and time outs left digits: 10 inches high.
 - 6. Clock, Colon, PERIOD Digits and Bonus Indicators: Amber LEDs.
 - 7. Score Digits and Possession Indicators: Red LEDs.

- F. Captions:
 - 1. HOME and GUEST Captions: 6 inches high.
 - 2. PERIOD Caption: 4 inches high.
 - 3. All Captions: White vinyl applied directly to scoreboard face.
- G. Horn:
 - 1. Vibrating Horn: Mounts behind scoreboard face.
 - 2. Sounds automatically when shot clock counts down to zero.
 - 3. Sounds manually as directed by operator.
- H. Power Cord:
 - 1. Cord is 11 feet long.
 - 2. Cord plugs into a standard grounded 120 V AC outlet.

2.2 SCORING CONSOLE

- A. Provide one control console per scoreboard, as appropriate for model provided.
- B. Capable of scoring basketball, volleyball, and wrestling through the use of keyboard inserts.
- C. Capable of controlling other scoreboards.
- D. Console has a maximum power requirement of 5 watts.
- E. Console recalls clock, score, and period information if power is lost.
- F. Console Include:
 - 1. Aluminum enclosure to house electronics.
 - 2. Sealed membrane water-resistant keyboard.
 - 3. 32-character liquid crystal prompting display to verify entries and recall information currently displayed.
 - 4. 6-foot-long power cord to plug into a standard grounded 120 VAC outlet.
 - 5. Hand-held switch for main clock start/stop and horn.
 - 6. Soft-sided carrying case.
 - 7. Practice timer mode:
 - a. Can sound horn at the end of each segment.
 - b. Has 99 programmable segments.
 - c. Displays the segment number and segment length.
 - d. Has a programmable interval time.
 - 8. Portable signal kit.
 - 9. 2.4 GHz spread spectrum radio for scoreboard control.
 - 10. Battery pack.

2.3 FACTORY FINISHES

- A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for, installation tolerances, and other conditions affecting performance of work.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide conduit cables and outlet boxes.

3.3 INSTALLATION

- A. Mount scoreboards in location detailed and in accordance with manufacturer's instructions. Unit to be plumb and level.
- B. Test the operation of the scoreboard and controller; leave control unit in carrying case and other loose items with Owner.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain shot timer scoreboards. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 11 66 47 - BASKETBALL SHOT TIMER SCOREBOARD**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Single-sided shot timer LED basketball scoreboard.
- B. Related Sections include the following:
 - 1. Division 11 Section "Basketball Scoreboard."

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's product illustrations, data, and literature that fully describe the scoreboards and accessories proposed for installation.
- B. Shop Drawings: Show installation details including wiring diagrams.
- C. Operation and Maintenance Data: To include in operation, and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Submittals."
- D. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of scoring equipment specified in this section and other sections through one source from a single manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- C. Regulatory Requirements: Fabricate and label shot timer scoreboard to comply with the following:
 - 1. ETL listed to UL Standards 48 and 1433.
 - 2. NEC compliant.
 - 3. FCC compliant.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store scoreboard and equipment in a clean, dry environment.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Shop Drawings.
- B. Environmental Limitations: Do not install scoring equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for project when occupied for its intended use.
- C. Supply weight and mounting method to verify that building structure is capable of supporting the scoreboard's weight in addition to the auxiliary equipment.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of shot timer scoreboards that fail in materials or workmanship within specified warranty period.
 - 1. Faulty operation of equipment.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- B. Warranty Period: 5 years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Provide an exchange program to supply replacement parts for components that fail during the coverage period. To minimize downtime, the exchange parts shall be shipped on the same day the order is received or on the following day. The manufacturer will also enclose an air bill for return of the defective components.
- B. Provide access to a local authorized service company.
- C. Provide a help desk staffed by experience technicians and coordinators who are thoroughly familiar with the scoreboard and available for technical support. The staff must be available at no additional cost to the customer and provide an "on-call" service during weekends.

PART 2 PRODUCTS

2.1 SHOT TIMER SCOREBOARD

- A. Basis-of-Design Product: The design for shot timer scoreboard is based on Daktronics, Inc.; BB-2115-13.
- B. General: Single-sided shot timer basketball scoreboard that displays game and event time including 1/10 second timing during the last minute, shot times up to a value of 99 seconds and counts down from any preset number between 0 and 99.
 - 1. Dimensions: 2'-4" high, 2'-5" wide, 0'-6" deep.
 - 2. Weight: 30 lbs.
 - 3. Power Requirements: 350 W.
 - 4. Color: To be selected by Architect from minimum 150 colors.
 - 5. Mounting: Mounted to basketball posts.
- C. Construction: Aluminum cabinet capable of withstanding high-velocity impact from indoor sports balls without the need for protective screens, as follows:
 - 1. Face and Perimeter: 0.063 inch thick.
 - 2. Back: 0.050 inch thick.
 - 3. Digit Faceplates: 0.090 inch thick.
- D. Digits:
 - 1. Provide manufacturer's standard Panaview digits.
 - 3. Seven bar segments per digit.
 - 5. Clock Digits: 7 inches high.
 - 6. Other Digits: 13 inches high.
 - 7. Clock Digits: Amber.
 - 8. Other Digits: Red.
- E. Horn:
 - 1. Vibrating Horn: Mounts behind scoreboard face.
 - 2. Sounds automatically when shot clock counts down to zero.

- F. Power Cord:
 - 1. Cord is 11 feet long.
 - 2. Cord plugs into a standard grounded 120 V AC outlet.

2.2 SCORING CONSOLE

- A. Basis-of-Design Product: Refer to Section 11 66 43.

2.3 FACTORY FINISHES

- A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for, installation tolerances, and other conditions affecting performance of work.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide conduit cables and outlet boxes.

3.3 INSTALLATION

- A. Mount shot clock to backstop brackets in location detailed and in accordance with manufacturer's instructions. Unit to be plumb and level.
- B. Test the operation of the scoreboard and controller; leave control unit in carrying case and other loose items with Owner.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain shot timer scoreboards. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 11 66 53 - GYMNASIUM DIVIDER**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes gymnasium divider curtain.
- B. Related Sections include the following:
 - 1. Division 26 Sections for electrical service for motor operators, controls, and other powered devices for motorized gymnasium divider.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. If applicable, include assembly, disassembly, and storage instructions for removable equipment.
 - 2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation including loads, point reactions, and locations for attachment of gymnasium dividers to structure.
- D. Samples for Initial Selection: For each type of gymnasium divider curtain fabric indicated.
- E. Samples for Verification: For divider curtain fabric, not less than 12 inches square of open mesh, and of opaque fabric.
- F. Product Certificates: For each type of gymnasium divider, signed by product manufacturer.
- G. Qualification Data: For installer and professional engineer.
- H. Operation and Maintenance Data: For gymnasium dividers to include in emergency, operation, and maintenance manuals.
- I. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of gymnasium divider from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install gymnasium divider until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Verify position for gymnasium divider.

1.5 COORDINATION

- A. Coordinate installation of overhead-supported gymnasium divider and suspension system components with other construction including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of gymnasium divider that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, faulty operation of gymnasium dividers.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extruded Bars, Profiles, and Tubes: ASTM B 221.
 - 2. Cast Aluminum: ASTM B 179.
 - 3. Flat Sheet: ASTM B 209.
- B. Steel: Comply with the following:
 - 1. Steel Plates, Shapes, and Bars: ASTM A 36.
 - 2. Steel Tubing: ASTM A 500 or ASTM A 513, cold formed.
 - 3. Steel Sheet: ASTM A 1011.
- C. Support Cable: Manufacturer's standard galvanized steel aircraft cable with a breaking strength of 7000 lb. Provide fittings complying with cable manufacturer's written instructions for size, number, and method of installation.
- D. Support Chain and Fittings: Grade 80 hardened alloy steel chain rated for overhead lifting, ASTM A 391/A 391M, with commercial-quality, hot-dip galvanized steel connectors and hangars.
- E. Castings and Hangers: Malleable iron, ASTM A 47, grade required for structural loading.
- F. Anchors, Fasteners, Fittings and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed; tamperproof, vandal- and theft-resistant design.

2.2 DIVIDER CURTAIN

- 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:
 - 1. Draper Inc.
 - 2. Jaypro Sports, LLC.
 - 3. Performance Sports Systems.
 - 4. Porter Athletic.
- B. Divider Curtain: Electrically operated, folding, and as follows:
 - 1. Upper Curtain, Mesh: Woven fabric of 100 percent polyester yarn coated with PVC weighing not less than 6.5 oz./sq. yd.
 - a. Mesh Color: White.
 - 2. Lower Curtain, Solid: Woven polyester coated with PVC, minimum 18 oz./sq. yd, embossed, 8-foot height above floor.
 - a. Fabric Color: As selected by Architect from manufacturer's full range.
- C. Curtain Fabrication: Fused seams and the following:
 - 1. Top Hem: Reinforce with double thickness mesh for grommets and continuous pipe batten.

- D. Accessories:
1. Grommets: Manufacturer's standard size and spacing, for snaps or S-hooks.
 2. Proof Coil Chain: Grade 30, No. 8, zinc plated, 3/16 inch, ASTM A 413.
 3. Curtain Battens: Fabricate battens from steel pipe with a minimum number of joints. As necessary for required lengths, connect pipe with drive-fit pipe sleeve not less than 18 inches long, and secure with 4 flush rivets, plug welds, threaded couplings, or another equally secure method. Shop-paint completed pipe battens with black paint.
 - a. Steel Pipe: ASTM A 53, Grade A, standard weight (Schedule 40), black, 1-1/2-inch nominal diameter, unless otherwise indicated.
- E. Divider Curtain Operator: Belt Drive.
- F. Divider Curtain Electric Operator: Provide operating machine of size and capacity recommended by manufacturer for equipment specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, and remote controls. Coordinate wiring requirements and electrical characteristics with building electrical system.
1. Operator Type: Electric motor, enclosed gear-head-reduction drive, with chain and sprocket secondary drive.
- G. Motor Characteristics: Sufficient to start, accelerate, reverse, and operate connected loads at designated speeds within installed environment and with indicated operating sequence, and without exceeding nameplate rating or considering service factor. Comply with NEMA MG 1, and the following:
1. Voltage: Coordinate with Electrical Construction Documents.
 2. Horsepower: 3/4 hp.
 3. Enclosure: Manufacturer's standard.
 4. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
 5. Remote-Control Station: Key pad control system; NEMA ICS 6, Type 1 enclosure for recessed or flush mounting.
- H. Safety Device: Provide Draper Model 504321 Curtain Lock safety device, or equal of other named manufacturers. Curtain Lok to be directly speed sensitive to automatically lock divider curtain in position at any time during storage or operation. In the event of an over-speed situation (greater than 1.5 feet per second) caused by malfunction of the hoisting apparatus, whether sudden or gradual, device will immediately activate.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for alignment of mounting substrates, installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.
1. Verify critical dimensions.
 2. Examine supporting structure.
 3. Examine wall assemblies, where reinforced to receive anchors and fasteners, to verify that locations of concealed reinforcements have been clearly marked. Locate reinforcements and mark locations.
 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written installation instructions. Complete field assembly, where required.
- B. Unless otherwise indicated, install gymnasium dividers after other finishing operations, including painting, have been completed.
- C. Gymnasium Divider and Components: Rigid, level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated on Shop Drawings; in proper relation to adjacent construction; and aligned with court layout.
 - 1. Verify clearances for movable components of gymnasium divider throughout entire range of operation and for access to operating components.
- D. Connections: Connect automatic operators to building electrical system.

3.3 ADJUSTING

- A. Adjust movable components of gymnasium divider to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.

3.4 CLEANING

- A. After completing gymnasium divider installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.
- B. Replace gymnasium divider components and finishes that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gymnasium divider. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 12 10 13 - MURALS**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
1. Custom murals.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include data on physical characteristics, durability, fade resistance, and flame-resistance characteristics.
- B. Shop Drawings: Include elevations of graphics with numbered panel installation sequence.
1. Samples for Verification: 36-inch wide by full height, 1/4-scale of full mural.
- C. Qualification Data: For installer and graphics printer.
- D. Product Certificates: For each component of mural system specified, signed by product manufacturer certifying compliance with specifications and suitability of product for intended use.
- E. Graphic Printer Certificates: Signed by graphic printer certifying that they comply with requirements and that products used to produce graphic are same products submitted as product data and samples for review, and accepted by Architect.
- F. LEED submittals: Product data for adhesive, primer/ sealer indicating VOC content in g/L.
- G. Maintenance Data: For film to include in maintenance manuals.
- H. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by film manufacturer, experienced in applying film similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Graphics Printer Qualifications: Printing company capable of demonstrating ability to produce large scale graphic image, and experienced in producing graphics on film similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of at least three previous projects successful in-service performance similar in size and scope as indicated for this Project.
- C. Single-Source Responsibility: Provide all components required for system specified, including inks and toner, through one source from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide film with the following fire-test-response characteristics as determined by testing identical products applied with identical adhesives to substrates per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Surface-Burning Characteristics: As follows, per ASTM E 84:
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install film until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install film until a permanent level of lighting is provided on the surfaces to receive film.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of murals that fail in performance, materials, or workmanship within specified warranty period.
 - 1. Failures in materials include, but are not limited to, premature graphic failure due to excessive fading, discoloration, crazing, peeling and blistering, or excessive dimensional change or loss of adhesion that make the graphic visually unacceptable when viewed from the intended viewing distance.
 - 2. Warranty Period: Eight years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Basis-of-Design Products: The design for each mural component specified is based on the product specified. Subject to compliance with requirements, provide either the named product or a comparable product by another manufacturer accepted by the Architect prior to bid.
- B. Approved Printer and Installers:
 - 1. Vomela the Imagemakers, 1-800-645-1012.
 - 2. Acorn Sign Graphics: www.acornsign.com.

2.2 MURAL PRODUCTS

- A. General: Provide custom graphics on wallcovering based on the following products:
- B. Graphic Print Film:
 - 1. Basis-of-Design Product - Smooth Wall Surfaces: 3M; Controltac 40C-20R.
 - 2. Basis-of-Design Product - Textured Surfaces including Masonry: 3M; 780mC-10R.
- C. Protective Laminate Film:
 - 1. Basis-of-Design Product: 3M; Scotchcal Matte Overlamine 8911 ES.
 - 2. Description: 3- to 4-mil thick, self-adhering sheet consisting of 1-mil-thick transparent polyester with release liner on adhesive side.
 - 3. Adhesive Type and Color: Pressure sensitive; clear.
- D. Color Agents:
 - 1. Basis-of-Design Product: 3M; Scotchprint Exterior Four Color Toner Series 8700/8800 and Trident Transfer Media ES.

2. Description: Four color electrostatic printing utilizing toners and image transfer media as recommended by manufacturer.
3. Colors, Textures, and Patterns: To be provided by Architect.

2.3 ACCESSORIES

- A. Primer/Sealer: Mildew-resistant primer/sealer complying with requirements in Division 9 Section "Painting" and recommended in writing by graphic film manufacturer for intended substrate.
- B. Application Tape: As recommended by film manufacturer.

2.4 FABRICATION

- A. General: Fabricate film panels in sizes and shapes necessary to comply with requirements indicated, including details on Drawings.
- B. Graphics: Custom graphics to be provided by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair graphic film's bond, including mold, mildew, oil, grease, incompatible primers, dirt, and dust.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 2. Gypsum Board: Prime with primer recommended by graphic film manufacturer.
 3. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION

- A. General: Comply with film manufacturer's written installation instructions applicable to products and applications indicated, except where more stringent requirements apply; perform work with a named approved installer.
- B. Install graphic film and protection film with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage or scratches.
- C. Match pattern. Match panels within each separate area by the following method:
 1. Sequence-matched, sizes as indicated on approved Shop Drawings.
- D. Install seams vertical and plumb. No horizontal seams are permitted.

- E. Fully bond graphic film to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- F. Fully bond protective laminate film to graphic film. Remove air bubbles, wrinkles, blisters, and other defects.
- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

3.4 CLEANING

- A. Use cleaning methods recommended in writing by film manufacturer.
- B. Replace strips that cannot be cleaned.
- C. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION

SECTION 12 21 13 - HORIZONTAL LOUVER BLINDS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Horizontal slat louver blinds.
- B. Operating hardware.

1.2 REFERENCE STANDARDS

- A. WCMA A100.1 - Safety of Window Covering Products; 2018.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating physical and dimensional characteristics and operating features.
- C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- D. Samples: Submit two samples, 18 inch long illustrating slat materials and finish, cord type and color.

1.4 PROJECT CONDITIONS

- A. Coordinate the work with window installation and placement of concealed blocking to support blinds.
- B. Store, handle, protect and install absorptive materials, including fabrics materials, in accordance with the Construction IAQ Management Plan required by Division 1 specifications.
- C. Take field measurements to determine sizes required.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Hunter Douglas; Model CD80: www.hunterdouglas.com.
- B. Levolor; Riviera Classic DustGuard 1-inch Blind: www.levolor.com/commercial.
- C. SWFcontract, a division of Spring Window Fashions, LLC; Bali Classic Custom Mini Blind Series 3000: www.swfcontract.com.

2.2 BLINDS

- A. Description: Horizontal slat louvers hung from full-width headrail with full-width bottom rail.
- B. Blinds: Horizontal slat louvers hung from full-width headrail with full-width bottom rail; manual control of raising and lowering by cord with full range locking; blade angle adjustable by control wand; complying with WCMA A100.1.
- C. Metal Slats: Spring tempered pre-finished aluminum; square slat corners, with manufacturing burrs removed.
 - 1. Width: 1 inch.
 - 2. Thickness: 0.008 inch.
 - 3. Color: As selected from manufacturers full range of colors.
- D. Slat Support: Woven polypropylene cord, ladder configuration.

- E. Head Rail: Pre-finished, formed aluminum box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats.
- F. Bottom Rail: Pre-finished, formed aluminum with top side shaped to match slat curvature; with end caps. Color: Same as headrail.
- G. Lift Cord: Braided nylon; continuous loop; complying with WCMA A100.1.
 - 1. Free end weighted.
 - 2. Color: As selected by Architect.
- H. Control Wand: Extruded solid plastic; hexagonal shape.
 - 1. Non-removable type.
 - 2. Length of window opening height less 3 inches.
 - 3. Color: Clear.
- I. Headrail Attachment: Wall brackets.

2.3 FABRICATION

- A. Fabricate blinds to fit within openings with uniform edge clearance of 3/8 inch.
- B. At openings requiring multiple blind units, provide separate blind assemblies with space of 1/4 inch between blinds, located at window mullion centers.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with flush countersunk fasteners.

3.2 TOLERANCES

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch.
- B. Maximum Offset From Level: 1/8 inch.

3.3 ADJUSTING

- A. Adjust blinds for smooth operation.

3.4 CLEANING

- A. Clean blind surfaces just prior to occupancy.

END OF SECTION

SECTION 12 24 13 - WINDOW SHADE SYSTEMS**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes room darkening roller shades.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
1. Motorized Shade Operators: Include operating instructions.
 2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.
- B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.
1. Motorized Shade Operators: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
 2. Wiring Diagrams: Power, system, and control wiring.
- C. Samples for Initial Selection: For each colored component of each type of shade indicated.
1. Include similar Samples of accessories involving color selection.
- D. Samples for Verification:
1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated.
 2. For the following products:
 - a. Shade Material: Not less than 3 inches square, with specified treatments applied. Mark face of material.
 - b. Fascia: Full-size unit, not less than 12 inches long.
 - c. Complete parts box containing motorized shade hardware.
- E. Product Certificates: For each type of roller shade, signed by product manufacturer.
- F. Qualification Data: For Installer.
- G. Product Test Reports: For each type of roller shade.
- H. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
1. Methods for maintaining roller shades and finishes.
 2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
 3. Operating hardware.
 4. Motorized shade operator.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed installation of roller shades similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations:

1. Obtain roller shades through one source from a single manufacturer.
2. To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacturer.

Coordinate the following with the roller shade installer/dealer:

- a. Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the Electrical Drawings.
 - b. Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
 - c. Roller shade installer/dealer shall run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
 - d. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/control locations designated by the Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit, as required by the electrical code having jurisdiction.
 - e. Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.
- C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
1. Flame-Resistance Ratings: Passes NFPA 701.
- D. Product Standard: Provide roller shades complying with WCMA A 100.1.
- E. Products specified in this section shall comply with applicable provisions of the ADA Standards.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name and location of installation.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Store, handle, protect and install absorptive materials, including fabrics materials, in accordance with the Construction IAQ Management Plan required by Division 1 specifications.
- C. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 WARRANTY

- A. Motorized Components (exclusive of shade motors and motor logic control systems and components): Twenty-five Years Fit for (intended) use per published terms and conditions, from the Date of Substantial Completion and contain provisions that installation is to remain operational without fault for the warranty period; and, include all operating parts, including shade band.
- B. Shade motors and motor logic control systems: Five years from Date of Substantial Completion for shade motors and motor logic control systems and components. Motorized shade installation will remain operational without fault for the warranty period and include all operational parts.
- C. Installation: Provide roller shade installer's warranty that installation shall be free of defects for a period of not less than 1 year.
- D. In the event of a warranted product failure, the roller shade installer will, at no cost to Owner, facilitate acquisition and delivery of all necessary components to the Owner. Owner will provide roller shade dealer/installer with direct access to the work, during dealer/installer's normal business hours.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Rollers Shades: Before installation begins, for each size, color, texture, and pattern indicated, full-size units equal to 5 percent of amount installed, or portion thereof.
 - 2. Shade Motors: 2 additional.

PART 2 PRODUCTS

2.1 ROLLER SHADES

- A. Basis-of-Design Products:
 - 1. Vertical Shades: Subject to compliance with requirements, provide MechoShade by MechoShade Systems or comparable products by Draper, Hunter Douglas Contract, Nysan or SWF Contract.
- B. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
 - 1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
 - 2. Shade band and Shade Roller Attachment:
 - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch in diameter for manual shades, and less than 2.55 inches for motorize shades are not acceptable.
 - b. Provide for positive mechanical engagement with drive / brake mechanism.
- C. Access and Material Requirements:
 - 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.

2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
 3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.
- D. Shade Brackets: Provide shade hardware constructed of minimum 1/8-inch thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
- E. Motorized Shade Hardware and Shade Brackets:
1. Provide shade hardware constructed of minimum 1/8-inch thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
 2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
 3. Basis-of-Design: ElectroShade II; six-sided box units for recessed installation with bottom slot opening.
- F. Manual Shade Bracket: Mecho/5 by MechoShade, Clutch Flexshade XD by Draper, unitized clutch of Nysan; SWF Contract Solar Shades or equivalent bracketed clutch of other named manufacturers.
- G. Pocket Mounting: Provide manufacturers surface mounted pocket with end caps where units are not installed in ceilings or bulkheads.
- H. Fascia: Provide at all locations where housing and shade are located below the ceiling surface.
1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
 2. Fascia shall be able to be installed across two or more shade bands in one piece.
 3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
 4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
- I. Mounting: Wall extension brackets mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.
- J. Shade Operation - Motorized operator: Locations indicated.
1. Shades for each area shall function as one group; all shades and all sides raising and lowering simultaneous, as Thermoveil Shadecloth.
 2. Shades on same local switch.

2.2 ROLLER SHADE FABRICATION

- A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch in either direction per 8 feet of shade height due to warp distortion or weave design. Fabricate hem as follows:
1. Concealed hem tube (Translucent Shades).
- C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth

within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

2.3 MANUAL OPERATED CHAIN DRIVE HARDWARE AND BRACKETS

- A. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
- B. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
- C. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
- D. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable
- E. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
- F. Drive Bracket / Brake Assembly:
 - 1. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
 - 2. The entire assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
- G. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.4 MOTORIZED ROLLER SHADE OPERATORS

- A. Basis-of-Design Product: Specifications and design of shade motors and motor control system are based on the IQ/MLC motor logic control system manufactured by MechoShade Systems, Inc. Other systems may be acceptable provide that all of the following performance capabilities are provided. Motor logic control systems not in complete compliance with these performance criteria shall not be accepted as equal systems.
- B. General: Provide factory-assembled motorized shade operation systems designed for lifting shades of type, size, weight, construction, use, and operation frequency indicated. Provide operation systems of size and capacity and with features, characteristics, and accessories suitable for Project conditions and recommended by shade manufacturer, complete with electric motors and factory-prewired motor controls, remote-control stations, power disconnect switches, enclosures protecting controls and all operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with the building electrical system.
- C. Comply with NFPA 70.
- D. Control Equipment:
 - 1. Provide power to each shade motor via individual 3 conductor line voltage circuits connecting each motor to the relay based motor logic controllers (IQ/MLC).

2. Control system components shall provide appropriate (spike and brown out) over-current protection (+/- 10 percent of line voltage) for each of the four individual motor circuits and shall be rated by UL or ETL as a recognized component of this system and tested as an integrated system.
 3. Control system shall allow for automatic alignment of shade hem bars in stopped position at 25 percent, 50 percent, and 75 percent of opening heights, and up to three user-defined intermediate stopping positions in addition to all up / all down, regardless of shade height, for a total of five positions. Control system shall allow shades to be stopped at any point in the opening height noting that shades may not be in alignment at these non-defined positions).
 4. Control system shall have two standard operating modes: Normal mode allowing the shades to be stopped anywhere in the window's opening height and uniform mode, allowing the shades to only be stopped at the predefined intermediate stop positions. Both modes shall allow for all up / all down positioning.
 5. Control system shall allow high rpm motors for shades over means of egress doors to be raised by input from building life safety system (at a speed / rpm determined by building code having jurisdiction), in addition to other modes of operation described in this specification.
- E. Electric Motors: UL-approved or -recognized, totally enclosed, insulated motor, complying with NEMA MG 1, with thermal-overload protection, brake, permanently lubricated bearings, and limit switches; sized by shade manufacturer to start and operate size and weight of shade considering service factor or considering Project's service conditions without exceeding nameplate ratings.
1. Service Factor: According to NEMA MG 1, unless otherwise indicated.
 2. Motor Characteristics: Single phase, 110 V, 60 Hz.
 3. Motor Mounting: Within manufacturer's standard roller enclosure.
- F. Remote Controls: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following devices for remote-control activation of shades:
1. Control Stations:
 - a. Three-button architectural flush mounted switches with metal cover plate and no exposed fasteners.
 - b. Connect local wall switches to control system components via low voltage (12V DC) 4-conductor modular cable equipped with RJ-11 type connectors supplied, installed and certified under Division 16 - Electrical.

2.5 SHADE CLOTH

- A. Translucent Single-Fabric Shadecloth Basis-of-Design: MechoShade Systems, Inc., EcoVeil group.
1. Shading:
 - a. EcoVeil Screens "1550 Series", 3 percent open.
- B. Colors: Selected from manufacturer's standard colors, more than one color may be used.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions. Allow clearances for window operation hardware.
- B. Connections: Connect motorized operators to building electrical system.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades.

END OF SECTION

SECTION 12 35 50 - EDUCATIONAL CASEWORK**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes plastic laminate casework and related items including, but not limited to, countertops, back splashes, filler panels, and scribe pieces, as necessary for complete installation.
 - 1. Related Sections include the following:
 - a. Division 8 Section "Resilient Flooring" for resilient wall base.
 - b. Division 25 Sections for sinks and fittings in countertops.
 - c. Division 26 Sections for electrical fittings and outlets.

1.2 SUBMITTALS

- A. Product Data: For each type of educational casework unit specified.
- B. Shop Drawings: Include plan layout, elevations, ends, cross-sections, location and type of service fittings, required clearances, methods of assembly and reassembly, design and arrangements.
- C. Samples for Selection: Manufacturer's color charts and material samples showing full range of colors, textures, and finishes. Submit a basic container unit with shelves, dividers, base and hardware. Samples must have cutaways to clearly demonstrate materials, construction, workmanship, and finish.
- D. Sample for Verification: Submit full size sample of typical cabinet which may be incorporated into the Work if in good condition and approved by Architect. Owner may take one cabinet unit off site for deconstructive testing. Cabinet will be selected at random. Replace unit at no extra cost to Owner.
- E. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements.
- F. Maintenance Data: For educational casework to include in maintenance manuals.
- G. Warranty: Special warranty specified in this Section.
- H. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 2: BPDO - Environmental Product Declarations
 - a. For composite wood, if available: Product-specific declaration or Industry-wide EPD or product-specific EPD.
 - 2. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content composite wood: Documentation indicating percentages by weight pre-consumer and post-consumer recycled content. Include material cost value.
 - 3. MR Credit 4: BPDO - Material Ingredients
 - a. For composite wood and plastic laminate, if available: Material Ingredient Report.
 - 4. EQ Credit 2: Low-Emitting Materials
 - a. For interior wet-applied adhesives, sealants, coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L. Include volume of material applied per product.
 - b. For composite wood installed within the building interior: Documentation indicating compliance with California Air Resources Board (CARB) Airborne Toxic Control

Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

1.3 QUALITY ASSURANCE

- B. Installer Qualifications: Engage a firm specializing in installation of casework for a minimum of 5 years and acceptable to manufacturer.
- C. Product Designations: Drawings indicate sizes and configurations of laboratory casework by referencing designated manufacturer's catalog numbers. Unless modified by notation on Drawings, or otherwise specified, catalog description for designated product constitutes requirements for each product and establishes a standard of design and quality for materials, construction and workmanship. Other acceptable manufacturers' laboratory casework of similar sizes, similar door and drawer configurations, and complying with the Specifications will be accepted
- D. Single Source Responsibility: To assure coordinated unit design, all items in each room or space, other than appliances and special equipment specified in other Sections, shall be products of one manufacturer to the greatest extent possible.
- E. Quality Standard: Except as otherwise indicated, comply with the following standards:
 - 1. AWI Cabinet Quality Standard: AWI Section 1600.
 - 2. AWI Countertop Quality Standard: AWI Section 400C.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Administrative Requirements."

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating educational casework without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of educational casework that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: 3 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cabinets by Design.
 - 2. Case Systems, Inc.
 - 3. LSI Corp. of America, Inc.
 - 4. The Mastercraft Woodworking Company.
 - 5. Southside Manufacturing Corp.
 - 6. TMI Systems Design Corporation.
 - 7. Paragon Casework.

2.2 MATERIALS

- A. Composite wood installed within the building interior: Comply with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.
 - 1. Particleboard: M-2.
 - 2. Plywood: Plywood that meets or exceeds the standards set forth by the APA for structural use panels.
- B. High Pressure Decorative Laminate: NEMA LD3, grades as indicated.
 - 1. Plastic Laminate: Vertical General Purpose Grade (VGS), 0.030-inch nominal thickness; for exterior cabinet surfaces, interiors of open cabinets, and underside of wall cabinets.
 - 2. Plastic Laminate Balancing Sheet: Cabinet Liner Grade (CLS), 0.020-inch nominal thickness, white high-pressure cabinet liner, for balancing exterior laminate surfaces.
- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.
 - b. Nevamar; International Paper; Decorative Products Div.
 - c. Wilsonart International; Div. of Premark International, Inc.
 - 2. Colors: As selected by Architect from manufacturer's full range of finishes and colors consisting of both patterns and solid colors. Provide a minimum of 100 patterns/colors to select from.
 - 3. End panels may match face or may be a color as selected from manufacturer's standard finishes and colors.
 - 4. A maximum total of 12 different casework colors will be selected for this Project. All exposed exterior elements including edges, door and cabinet sides, and exposed backs shall be available in matching color.
- D. Pressure Fused Laminate: Melamine resin impregnated, 90 gram PSM minimum, thermofused to core under pressure, complying with NEMA LD3 VGS and NEMA LD3 CLS standards.
 - 1. Provide white pressure fused laminate for cabinet interiors behind doors and drawers.
 - 2. Provide balanced construction at all concealed surfaces with thermofused melamine. Unsurfaced coreboard or simple backers will not be accepted.
- E. Hardboard:
 - 1. Hardboard shall meet or exceed Commercial Standards CS-251 and Federal Specifications LLL-B-00810.
 - 2. Tempered Hardboard 1/4 inch thick, smooth both sides.
 - 3. Hardboard exposed one side to be 1/4 inch thick, prefinished in putty color to match cabinet interior. Opposite face prefinished with neutral color balance coating.
- F. Edging Materials: Comply with the following:
 - 1. Exposed Exterior Cabinet Edges, Interior Dividers, Drawer Bodies, and Shelves: Banded with matching material, resistant to chipping, cracking, and high impact, applied with waterproof hot melt adhesive.
 - 2. Door and Drawer Front Edges: Banded with contrasting or matching PVC extrusion, 3 mm thick, resistant to chipping, cracking, and high impact, applied with waterproof hot melt adhesive, and shaped to provide radiused edges and corners.
 - 3. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost

to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.

G. Hardware:

1. Hinges: Hinges fully concealed from view when door is in closed position and shall permit 176-degree door swing. Hinge crank of heavy duty steel with a concealed integral self-closing spring mechanism. Hinge bosses of heavy duty diecast steel. Nylon expansion inserts to be provided in door for positive screw attachment. Hinge shall incorporate mounting features providing three-dimensional adjustment. Hinges to have lifetime guarantee as warranted by manufacturer. Doors less than 48 inches in height with 2 hinges per door, doors 48 to 63 inches in height with 3 hinges per door and all doors in excess of 63 inches with 4 hinges per door.
2. Wire Pulls: Stainless steel, accurately positioned on door and drawer front with #8-32 screws.
3. Door Catch: Heavy duty, spring-loaded, large roller type. Each door with a single catch mounted at the bottom edge. All mobile cabinets and doors over 48 inches high with a catch at both top and bottom of door.
4. Catch Strike Plate: Injection molded nylon, with integral molded engagement ridge. Strike plate to also provide a wide face bumper insuring a positive door stop.
5. Hanger Rods: 1-inch diameter heavy gage plated tubing, securely affixed in cabinet with injection molded rod sockets.
6. Drawer and Slide-Out Shelf Slides: Nylon roller steel slides to insure quiet, smooth operation. 100-lb load rating with built-in drawer stop and self-close feature in the last 1-inch of travel.
7. File Drawer Slides: Full extension steel slides with ball bearing nylon rollers. 100-lb. load rating.
8. Locks: Cylinder type, diecast, with 5 disc tumbler mechanism. Each lock to be provided with a milled brass key with keying options of keyed alike, keyed different, and master keyed locks, as selected by Owner. Provide locks on all cabinet doors and drawers, except sink and fumehood base cabinets.
9. Grommets: Plastic or metal, 1.5-inch-diameter, placed at each computer station.

H. Adjustable Shelf Support System:

1. Support Clips for Adjustable Shelves: 3/4-inch-and 1-inch-thick, injection molded nylon, incorporating integrally molded lock tabs to retain shelf from tipping or inadvertently being lifted out. Support clip to have double pin engagement into precision bored hole pattern in cabinet vertical members, with molded ridge in the clip body to provide additional pressure against edge of shelving and to maintain positive pin engagement. Clip shall be designed to provide means to permanently attach shelf to support clips. Static test load must exceed 200-lb per clip.
2. Vertical and Horizontal Shelf Dividers: 1/4-inch-thick, fully adjustable and retained with injection molded nylon support clip designed to trap divider to eliminate inadvertent lift out.
3. Adjustable Shelves and Dividers: Adjustable at 1.25 inches o.c. through full height of compartment.

I. Wardrobe Clothes Pole: 1-1/16-inch chrome steel rod – LH-362.

J. Wardrobe Clothes Pole Socket: Knap & Vogt #734 Flange Chrome.

K. Coat Hooks:

1. Single coat hooks - HEWI No. 520.60.1 ABS plastic, color to be selected by Architect from manufacturer's full range.

2. Double coat hooks - HEWI 520.50.2 ABS plastic, color to be selected by Architect from manufacturer's full range.
 3. Ceiling hooks - HEWI 513 ABS plastic, color to be selected by Architect from manufacturer's full range.
- L. Hangers: Captive and removable wood or metal; 17-inch.
- M. Recycled Content: Provide particleboard and MDF with minimum 80 percent recycled content.
- N. Interior wet-applied adhesives, sealants, and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."

2.3 COUNTERTOPS

- A. Reference Section 12 36 00 Countertops.

2.4 FABRICATION, GENERAL

- A. Cabinet Construction: High-pressure plastic laminate surface finish; flush overlay type door/drawer style.
1. Cabinet Box Core shall be Plywood.
 2. When the rear of a cabinet is exposed, provide a separate finished 3/4" thick decorative laminate back panel.
 3. Backs of cabinets are 1/2" thick surfaced both sides for balanced construction and fully captured on both sides and bottom.
 4. A 5mm diameter row hole pattern 32mm (1-1/4") on center shall be bored in cabinet ends for adjustable shelves. This row hole pattern shall also serve for hardware mounting and replacement and/or relocation of cabinet components.
 5. An upper 3/4" thick stretcher shall be located behind the back panel and attached between the end panels with mechanical fasteners. This stretcher is also fastened to the full sub-top thus capturing the back panel.
- B. Chemical Content: All materials used shall be relatively nontoxic when exposed to heat or flame.
- C. Wall Hung Units: When mounted on a wall and loaded with 25 psf on all horizontal surfaces, units shall resist a lateral force applied at the bottom of the cabinet parallel to the long dimension of the cabinet of 300 lbs without failure. Each wall hung unit shall safely support a uniform load of 600 lbs.
- D. Storage units with or without doors shall be able to have shelves and/or vertical dividers rearranged within one or more units of same size without defacing interior of unit.

2.5 FABRICATION, CABINETS

- A. Base Cabinet Construction: Core shall be plywood.
1. All base cabinets, except sink cabinets, shall have a solid 3/4" thick sub-top of core, fastened between the ends with interlocking mechanical fasteners.
 2. Sink cabinets with a split removable back panel shall have a formed metal front brace, and steel corner gussets shall be utilized to support and securely fasten top in all four corners. Front brace shall be powder coated black.
- B. Drawers:
1. Drawers: Full box body design with a separate front; body sides and ends minimum 5/8-inch medium density particleboard with melamine laminate faces and matching color PVC top edges; bottoms minimum 1/4-inch thick medium density particleboard with melamine facing.

2. Corner Joints: Interlocking dowel pin design, with 8mm diameter dowel pins inserted into drawer ends and fitted into matching hole patterns in drawer sides. Bottoms to be let into grooves all four sides; all joints glued and bottoms shall have additional mechanical fasteners; drawers to operate on mechanical slides as separately described.
 3. Separate drawer front, surfaced and edges as described, attached to drawer body with no less than 4 screws through front side.
- C. Solid Hinged Doors: 3/4-inch thick particleboard core, balanced construction laminate faces. Surfacing, edging and hinges as separately described.
 - D. Solid Sliding Doors: 3/4-inch thick particleboard core, balanced construction laminate faces. Each door with 2 nylon rollers mounted in bottom of door panel, and with door operating in aluminum top and bottom tracks. Surfacing and edging as separately described.
 - E. Sliding Display Doors: Constructed of 1/4-inch thick, distortion free glazing sheets. Outer edge to have full length aluminum pull channel for strength. Doors must be accurately sized for easy movement in upper and lower extruded aluminum guide channels.
 - F. Adjustable Shelves: Shelves less than 36 inches in length shall be 3/4 inches thick. Shelves 36 inches long and over, and all adjustable shelves in wall cabinets and bookcases shall be 1 inch thick. Shelves shall be constructed of plywood with melamine laminate surfaces. Leading edge of shelf finished with a high impact, rigid PVC extrusion, in color to match shelf surface and cabinet interior. Exposed surfaces of open shelving without doors shall be finished with plastic laminate.
 - G. Frame Rails Between Drawers: Full cabinet length, 3/4 inches thick by 3-1/2 inches wide, pinned, and fastened into cabinet sides. Front leading edge to be edged as separately described.
 - H. Tote Trays: High impact polystyrene with smooth edges. Provide each tray with a card holder. Suspend tote trays from rails securely attached to cabinet partitions and sides.

2.6 FABRICATION, FIXED CASEWORK (BASE, WALL, HUTCH, AND TALL UNITS)

- A. Corner Joints: Incorporate fluted hardwood dowel pin construction, factory glued and clamped under pressure to assure rigid loadbearing corner joints.
- B. Cabinet Ends: 3/4-inch-thick plywood panels of balanced construction, precision bored for fluted hardwood dowel pins installed in horizontal cabinet members. Base and tall units with one piece end panels continuous to floor for added load capability. Unexposed ends with laminate backing sheet.
- C. Cabinet Bottoms and Tops: 3/4-inch-thick plywood panels of balanced construction for base and tall units. Precision bore panels to receive fluted hardwood dowel pins inserted with glue. Dowel pins shall extend from the panel ends for joining into mating hole patterns in the cabinets' side panels.
- D. Wall Cabinets: Full 1-inch-thick plywood panels of balanced construction, with the same fluted hardwood fluted dowel pin and glue joint construction as the base and tall cabinets.
- E. Kick Panels: 4-inch-high, set back from cabinets' front edge and mechanically fastened to cabinet bottom and ends, to be an integral part of cabinet structure.
- F. Back Panels: 3/8-inch-thick, set in 3/8 inch from rear panels of balanced construction surfaced as described.
- G. Finished exposed backs of fixed cabinets shall be 3/4-inch-thick panels of balanced construction surfaced as described.
- H. Hanging rails to be provided in wall cabinets in upper back corner for mounting units to walls.

I. Cabinet Subbase:

1. To be separate and continuous (no cabinet body sides-to-floor), water-resistant exterior grade plywood with concealed fastening to cabinet bottom.
2. Ladder-type construction of front, back and intermediates to form a secure and level platform to which cabinets attach.

2.7 FABRICATION, MOBILE CASEWORK

- A. Corner Joints: Incorporate a rigid fluted hardwood dowel pin construction system, glued and clamped under pressure.
- B. Ends: 3/4-inch-thick panels of balanced construction precision bored for dowel pins installed in horizontal cabinet members.
- C. Mobile Cabinets: Provide with a double bottom and top frame panel design.
 1. Interior bottoms and tops, 3/4-inch-thick panels of balanced construction. The front leading edge of these panels built-up to 1-1/2 inch thick and edged with rigid PVC. Panels bored to receive fluted dowel pins with pins to be inserted with glue and join mating hole pattern in cabinet side panel.
 2. Exterior bottoms and tops, 3/4-inch thick panels of balanced construction. Panels to extend past all four sides of the unit and edged with high impact plastic extrusion to form a wrap-around bumper system to prevent damage during normal use. Bumper system shall be standard on all mobile units.
- D. Casters: Provide each mobile cabinet with four heavy duty 5-inch ball bearing swivel casters with a minimum wheel face of 1-1/4 inches, and 290-lb working load rating per caster. Provide two front casters with wheel lock. Attach each caster with four flat head bolts with lock nuts through bottom panels.
- E. Backs: 3/4-inch-thick panel of balanced construction and finished with exterior surfaces laminate. Backs tenoned into cabinet ends and grooved to accept interior top and bottom panels, and fastened with glue, screws, and corner brackets.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for, installation tolerances, and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Do not install casework units until painting and drywall work in the space has been completed and the space is dry.
- B. Install cabinets in such a way that relocation can be accomplished without marred end panels and use of special tools.
- C. Install cabinets under supervision of manufacturer's representative with factory-trained journeymen authorized by manufacturer.
- D. Install cabinets indicated on Drawings in correct locations.
- E. Erect casework straight, level and plumb and securely anchor in place; base cabinets installed on plywood ladder bases.
- F. Mount wall-hung cabinets on concealed 1-by-3 softwood hanging strips secured to wall with expansion or toggle bolts, minimum four per cabinet.

- G. Firmly anchor fixed cabinets and any required scribe moldings to walls and floors. Finish of scribe molding shall match cabinets.
- H. Furnish scribes 3/4 inch thick and filler pieces to fill spaces in material matching cabinet panels or frames, between units and between units and walls where open spaces occur.
- I. Patch surfaces damaged by installation to new condition or remove and install new material as approved.
- J. Rims of sinks specified in Division 22 shall be set in sealant to insure waterproof seal between rim and countertop.
- K. Seal joints between all cabinets and wall.

3.3 CLEANING AND PROTECTION

- A. Leave finished work clean, free of scratches, dents, gouges, or other damage, with doors and drawers operating freely at time of final acceptance. Leave work area clean and free of debris.
- B. Protect materials and installed casework from damage by work of other trades.

END OF SECTION

SECTION 12 35 51 - MUSICAL INSTRUMENT STORAGE CABINETS**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Musical instrument and uniform cabinet system.

1.2 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Design system of storage cabinets for uniforms (ventilated) and musical instruments which are chip- and abrasion-resistant under normal usage and will protect instruments and cases from damage under normal use.
 - 2. Design shelving to withstand continuous use without surface or front edge breakdown.
 - 3. Design cabinet panels with polyester laminate on both sides to provide modularity and/or relocation of any cabinet.

1.3 PERFORMANCE REQUIREMENTS

- A. Hanger rods shall support a minimum vertical load of 200 lbs applied anywhere.
- B. Full height doors shall support a minimum vertical live load of 315 lbs applied to outer edge.
- C. Compartment door hinges must be through-bolt construction to cabinet panels; other attachment will not be accepted.

1.4 SUBMITTALS

- A. Product Data: Applicable reference standards, performance data, and application recommendations and limitations, and finishes.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, and hardware.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material exposed to view.
- D. Samples for Verification: For the following materials, in sets showing full range of color, texture, and pattern variations expected:
 - 1. Plastic Laminate for Casework Finish: 8 by 10 inches.
 - 2. Hardware: One unit of each type of exposed hardware.
- E. Product Schedule: For musical instrument storage cabinets. Use same designations indicated on Drawings.
- F. Product Certificates: For each type of musical instrument storage cabinet, signed by product manufacturer certifying that products furnished comply with requirements.
- G. Maintenance Data: To include in maintenance manuals.
- H. Warranty: Special warranty specified in this Section.
- I. Submit certification of application of borate treatment to woodwork in contact with slab.
- J. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials

- a. For certified wood: Documentation indicating percentage new wood, percentage FSC and Chain-of-Custody (CoC) certificates indicating compliance with forest certification requirements. Include vendor invoice indicating FSC CoC.
2. EQ Credit 2: Low-Emitting Materials
 - a. For composite wood installed within the building interior: Documentation indicating compliance with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM), Phase II for ultra-low-emitting formaldehyde (ULEF) resins or containing no added formaldehyde resins.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of musical instrument storage cabinet manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain cabinets through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, dimensional requirements, and finish material of casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes, similar door and drawer configurations, same finish material, and complying with the Specifications may be considered. Refer to Division 1 Section "Product Requirements."
- D. Quality Standards: Unless otherwise indicated, comply with the following standards:
 1. ANSI/BHMA Standard A156.9, Grade 1.
 2. American Laminators Association Performance Standard ALA 1985.
- E. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver musical instrument storage cabinets only after painting and similar operations that could damage, soil, or deteriorate cabinets have been completed in installation areas where cabinets must be stored in other than installation areas; store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install musical instrument storage cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where musical instrument storage cabinets are indicated to fit to other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating musical instrument storage cabinets without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate layout and installation of blocking and reinforcement in partitions for support of cabinets.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of musical instrument storage cabinets that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Delamination of components or other failures of glue bond.
 - 2. Warping of components.
 - 3. Failure of operating hardware.
 - 4. Deterioration of finishes.
- B. Warranty Period: Three years from date of Substantial Completion.

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:
 - 1. Wenger Corporation (Basis-of-Design).
 - 2. Case Systems (modified for performance requirements).
 - 3. LSI Corporation of America, Inc. (modified for performance requirements).

2.2 MATERIALS

- A. Wood Products: Comply with the following:
 - 1. Hardboard: AHA A135.4.
 - 2. Particleboard: ANSI A208.1, Type M-3 Exterior Glue complying with requirements in ANSI A208.1, Grade M-3.
 - 3. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no added urea formaldehyde.
- B. Thermoset Decorative Panels: Particleboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
 - 1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semiexposed edges.
- C. High-Pressure Decorative Laminate: NEMA LD 3.
- D. Composite wood installed within the building interior: Contain no added formaldehyde resins or comply with the California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) for formaldehyde emissions for ultra-low-emitting formaldehyde (ULEF) resins.

2.3 MATERIALS, GENERAL

- A. Cabinet Wall Panels: 3/4-inch-thick industrial (cabinet) grade particleboard, minimum 48 pcf with thermoset polyester laminate on both sides for totally finished construction.
- B. Cabinet Shelving:
 - 1. Cabinets up to 27 Inches Wide: One-piece, high molecular, blow-molded polyethylene with radiused front edge. Mount to cabinet walls with one-piece molded rigid ST nylon clip. Shelf is replaceable.
 - 2. Cabinets over 27 Inches Wide: One-piece, high molecular-formed polyethylene with radiused front edge and 3/16-inch wall thickness. Ribbed for structural integrity. Supported by four 1-by 1-1/2 inch steel tubes with 0.060-inch-thick wall thickness and 0.075-inch-thick plates welded to ends.
- C. Wood Doors: Same construction as cabinet walls.

1. Finish: Maple.
 - a. Available Product: Timber Products; Plank Maple Birch.
2. Hardware:
 - a. Hinges: 5-knuckle, institutional type hinge, capable of supporting 315 lbs. dynamic vertical load. Hinge pin shall be 2-3/4 inches long. Fastened to cabinet and door with through-bolt construction. Provide two hinges on compartment doors; four hinges on full height doors.
 - 1) Finish: Powder coating.
 - b. Lock: Locking slide-bolt designed for padlocks, with strike plate; 0.105-inch-thick steel. Provide clear plastic label holder for identification card insert.
 - 1) Finish: Powder coating.
- D. Grille Doors: Welded steel grille construction with powder coat finish. Welds at tee-joints shall be 360 degrees.
 1. Hardware:
 - a. Hinges: 5-knuckle, institutional type hinge, capable of supporting 315 lbs. dynamic vertical load. Hinge pin shall be 2-3/4 inches long. Weld to door frame in five places. Fasten to cabinet and door with through-bolt construction. Provide two hinges on compartment doors; four hinges on full height doors.
 - b. Finish: Powder coating.
- E. Edging: Heat bonded 3 mm beveled PVC edge-banding.
- F. Finish Hardware:
 1. Joinery Hardware: 2-inch, 1/4-20 panel connectors with 15 mm head diameter, and steel thread inserts.
 2. Cabinet Levelers: Four leveling glides within minimum 3/8-inch diameter threaded rod in steel corner brackets, six glides for cabinets with divider panels.
- G. Cabinet Back Panel:
 1. Cabinet Back: 1/4-inch-thick prefinished hardboard. Match color of interior side of top panels.

2.4 ACCESSORIES

- A. Vertical Closure Kit: Provide visual closure between wall and cabinet. Constructed of 3/4-inch-thick thermoset polyester composite wood to match cabinet side panels for 3/4 inch to 30 inch wide openings.
- B. Horizontal Closure Kit: Provide visual closure between top of cabinet and soffit. Constructed of 3/4-inch-thick thermoset polyester composite wood to match cabinet side panels for 3/4 inch to 30 inch high openings.
- C. Top Back Filler Kit: Provide visual closure between back wall and top panel of cabinet. Constructed of 3/4-inch-thick thermoset polyester composite wood to match cabinet top panels for 10-inch and 20-inch deep openings.
- D. Finished Back Panel: Provide panel to attach to cabinet back that is exposed. Constructed of 1/2-inch-thick thermoset polyester composite wood to match cabinet.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for, installation tolerances, location of reinforcements, and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CABINET ERECTION

- A. Install cabinet system in accordance with manufacturer's instructions.
- B. Install cabinet system with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face.
- C. Install cabinet system without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.
- D. Install cabinet system level and plumb to a tolerance of 1/8 inch in 8 feet.
- E. Fasten cabinets to adjacent units and to backing.
 1. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
 2. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c., with toggle bolts through metal backing behind gypsum board.
- F. Seal all joints between cabinets and walls.

3.3 TERMITE TREATMENT

- A. Field-apply borate surface treatment to lower 12 inches of woodwork in contact with slab on grade.

3.4 ADJUSTING AND CLEANING

- A. Adjust cabinets and hardware so doors are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- B. Clean cabinets on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas to match original factory-finish as approved by Architect.

3.5 PROTECTION

- A. Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION

SECTION 12 35 53 - WOOD LABORATORY CASEWORK**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Wood laboratory casework.
 - 2. Laboratory countertops.
 - 3. Shelves.
 - 4. Laboratory sinks and troughs.
 - 5. Laboratory fixtures.
 - 6. Accessories.
- B. Wood laboratory casework and equipment as specified herein and as scheduled, and noted on the drawings is to be furnished, delivered, and installed in the location required by the drawings, and left ready for connection of plumbing fixtures and electrical fixtures by others.
- C. Casework, equipment, service fixtures and related work shall include:
 - 1. Furnishing, delivering to the building, uncrating, setting in place and leveling all casework and equipment listed in this specification or equipment schedule and/or shown on the drawings.
 - 2. Furnishing plumbing fixtures and fittings as defined in this specification, complete with tank nipples and lock nuts for mounting fixtures and fittings to tops or curbs. Fixtures shall be furnished assembled, in properly marked cartons for installation by casework contractor. Final hook up or connection to services shall be by others. Nipples for hot and cold water shall be brass.
 - 3. Furnishing electrical service fixtures directly attached to the casework or equipment as called for in this specification, equipment list and/or shown on the drawings. Fixtures shall be furnished assembled in properly marked cartons for installation and final hook up or connection by others. Rough in boxes for duplex receptacles and data drops located in cabinetry or aprons shall be installed at the factory by the equipment manufacturer.
 - 4. Furnishing of sink bowls and cupsinks, complete with required sink supports, overflows, and outlets with plugs and strainers, as called for in this specification, equipment schedule and/or shown on the drawings. Units shall be assembled and installed by casework contractor. Separate outlets shall not exceed 4" in length. Outlets shall be furnished without couplings required to connect to the drain piping system. Installation of the outlets shall be by casework supplier.
 - 5. Furnish along with specified fume hoods all service fixtures, fittings, remote control rods, escutcheon plates, valve handles and nipples. Service fixtures shall be furnished attached to superstructure and pre-piped below countertop for final connection by others.
 - 6. Furnishing and installing countertops as shown on the drawings, of the size and shape required on all laboratory casework.
 - 7. Remove all debris, dirt and rubbish accumulated as a result of installation of this equipment, leaving premises broom clean and orderly.
 - 8. Final Adjustment: It is recognized that wood doors and drawers will swell and stick because of unusually high ambient moisture in new construction work. Casework installer shall during the first year return after final inspection to make any final adjustments to drawers and doors to eliminate sticking or other problems. Any doors or drawers, which cannot be corrected shall be replaced.
- D. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for wood blocking for anchoring laboratory casework.
2. Division 9 Section "Gypsum Board Assemblies" for reinforcements in metal-framed gypsum board partitions for anchoring laboratory casework.
3. Division 9 Section "Resilient Flooring" for resilient base applied to wood laboratory casework.
4. Division 11 Section "Laboratory Fume Hoods" for fume hoods, including base cabinets and countertops under fume hoods.
5. Division 22 Sections for sinks and fittings in countertops.
6. Division 26 Sections for electrical fittings and outlets.

1.2 DEFINITIONS

- A. Exposed Portions of Casework: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches above floor, and visible surfaces in open cabinets or behind glass doors.
 1. Ends of cabinets indicated to be installed directly against and completely concealed by walls or other cabinets after installation shall not be considered exposed.
- B. Semiexposed Portions of Casework: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches or more above floor are defined as semiexposed.
- C. Concealed portions of casework include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include independent certification that applied finish complies with specified chemical and physical resistance requirements.
- B. Report: For composite wood and laminating adhesives, documentation indicating no added urea formaldehyde resins.
- C. Shop Drawings: For wood laboratory casework. Include plans, elevations, sections, details, and attachments to other work.
 1. Indicate locations of blocking and reinforcements required for installing laboratory casework.
 2. Include details of exposed conduits, if required, for service fittings.
 3. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and other laboratory equipment.
 4. Include coordinated dimensions for laboratory equipment and service fittings specified in other Sections.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework finishes and countertops with requirements specified for chemical and physical resistance.
- E. Maintenance Data: For laboratory casework to include in maintenance manuals.
- F. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain laboratory casework, including countertops, sinks, service fittings, and accessories, through one source from a single manufacturer.
 1. Obtain through same source from same manufacturer as fume hoods specified in Division 11 Section "Laboratory Fume Hoods."

- B. Product Designations: Drawings indicate sizes and configurations of laboratory casework by referencing designated manufacturer's catalog numbers. Unless modified by notation on Drawings, or otherwise specified, catalog description for designated product constitutes requirements for each product and establishes a standard of design and quality for materials, construction and workmanship. Other acceptable manufacturers' laboratory casework of similar sizes, similar door and drawer configurations, and complying with the Specifications will be accepted.
- C. Product Standard: Comply with SEFA 8, "Laboratory Furniture--Casework, Shelving and Tables--Recommended Practices."
- D. Flammable Liquid Storage: Where cabinets are indicated for solvent or flammable liquid storage, provide units that are listed and labeled as complying with requirements of NFPA 30 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- E. 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.
- F. Accessibility Requirements: In addition to local governing regulations, comply with "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Administrative Requirements."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver laboratory casework only after wet operations in areas where casework is to be installed are completed.
- B. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.
- C. Store completed laboratory casework in a ventilated place, protected from the weather, with relative humidity of 50 percent or less at 70 deg F.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install wood laboratory casework until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of wood laboratory casework.
- B. Coordinate installation of wood laboratory casework with installation of fume hoods and other laboratory equipment.

1.8 WARRANTY

- A. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of laboratory casework systems due to defects of material and workmanship. Warranty shall not cover damage caused by misuse or negligence.
 - 1. Warranty Period: 3years from date of Substantial Completion.

1.9 EXTRA MATERIALS

- A. Furnish complete touchup kit for each type and color of wood laboratory casework provided. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged laboratory casework finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Wood Laboratory Casework:
 - a. Basis-of-Design: Campbell Rhea.
 - b. Cabinets by Design.
 - c. Leonard Peterson.
 - d. Sheldon Laboratory Systems.
 - e. Kewaunee Scientific Corporation, Laboratory Products Group.
 - 2. Epoxy Countertops, Sinks and Troughs:
 - a. Durcon Company, Inc. (The).
 - b. Epoxyn Products.
 - c. Laboratory Tops, Inc.
 - d. Prime Industries, Inc.

2.2 CABINET MATERIALS

- A. General:
 - 1. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
 - 2. Hardwood Plywood: HPVA HP-1 made with adhesive containing no urea formaldehyde, either veneer core or particle core, unless otherwise indicated.
 - 3. Edgbanding for Wood-Veneered Construction: Minimum 1/8-inch-thick, solid wood of same species as face veneer; laminating glue shall contain no urea-formaldehyde.
- B. Exposed Materials:
 - 1. General: Provide materials that are selected and arranged for compatible grain and color. Do not use materials adjacent to one another that are noticeably dissimilar in color, grain, figure, or natural character markings.
 - 2. Wood Species and Veneer Cut: Maple, plain sawn.
 - 3. Stain Colors and Finishes: As selected by Architect from manufacturer's full range.
 - 4. Solid Wood: Clear hardwood lumber.
 - 5. Plywood: Urea-formaldehyde free hardwood plywood; Grade A exposed faces at least 1/50 inch thick, Grade J crossbands, and backs of same species as faces.
- C. Semiexposed Materials:
 - 1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects, of any species similar in color and grain to exposed solid wood.
 - 2. Plywood: Urea-formaldehyde free hardwood plywood of any species similar in color and grain to exposed plywood. Grade B faces, Grade J crossbands, and backs of same species as faces. Semiexposed backs of plywood with exposed faces shall be same species as faces.
- D. Concealed Materials:
 - 1. Solid Wood: Any hardwood or softwood species, with no defects affecting strength or utility.

2. Plywood: Urea-formaldehyde free hardwood plywood. Concealed backs of plywood with exposed or semiexposed faces shall be same species as faces.
 3. Particleboard: ANSI A208.1, Grade M-3 Exterior Glue complying with requirements in ANSI A208.1, Grade M-3.
 4. Hardboard: AHA A135.4, Class 1 tempered.
- E. Glass for Glazed Doors: Clear tempered glass complying with ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; not less than 5.5 mm thick.

2.3 CABINET DESIGN

- A. As indicated by scheduled product listed on the Drawings.
- B. Grain Direction: Vertical on doors, horizontal on drawer fronts.

2.4 CABINET FABRICATION

- A. Construction: Provide wood-faced laboratory casework of the following minimum construction:
 1. Bottoms and Ends of Cabinets, Shelves, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch- thick plywood.
 2. Base Cabinet Top Frames: 3/4-by-2-inch solid wood with mortise and tenon or doweled connections, glued with urea-formaldehyde free glue and pinned or screwed.
 3. Backs of Cabinets: 3/4-inch- thick plywood where exposed, 1/4-inch- thick hardboard dadoed into sides, bottoms, and tops where not exposed.
 4. Security Panels: 1/4-inch-thick hardboard panels between drawers and between drawers and doors when base cabinet locks are keyed differently.
 5. Drawer Fronts: 3/4-inch- thick plywood or solid hardwood.
 6. Drawer Sides and Backs: 1/2-inch- thick solid wood or plywood, with urea-formaldehyde free glued dovetail or multiple-dowel joints.
 7. Drawer Bottoms: 1/4-inch- thick plywood glued and dadoed into front, back, and sides of drawers. Use 1/2-inch- thick material for drawers more than 24 inches wide.
 8. Doors 48 Inches or Less in Height: 3/4 inch thick, with particleboard or medium-density fiberboard cores, solid hardwood stiles and rails, and hardwood face veneers and crossbands.
 9. Doors More Than 48 Inches in Height: 1-1/8 inches thick, with honeycomb cores, solid hardwood stiles and rails, and veneer plywood on both sides.
 10. Stiles and Rails of Glazed Doors: 3/4-inch- thick solid hardwood.
- B. Leg Shoes: Vinyl or rubber, black, open-bottom type.
 1. Provide minimum 1-1/2-inch-diameter, nonmarring floor glides with minimum 5/8-inch height adjustment capability, for open-leg tables.
- C. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinet fronts.
- D. Accessibility Requirements: Modify cabinets where indicated, as required to comply with the "Americans with Disabilities Act (ADA)."

2.5 WOOD FINISH

- A. Preparation: Sand lumber and plywood for laboratory casework construction before assembling. Sand edges of doors, drawer fronts, and molded shapes with profile-edge sander. Sand casework after assembling for uniform smoothness at least equivalent to that produced by 220 grit sanding and without machine marks, cross sanding, or other surface blemishes.

- B. Staining: Remove fibers and dust and apply stain to exposed and semiexposed surfaces as necessary to match approved Samples. Apply stain in a manner that will produce a consistent appearance. Apply wash-coat sealer before applying stain to closed-grain wood species.
- C. Chemical-Resistant Finish: Apply laboratory casework manufacturer's standard three-coat, chemical-resistant, transparent finish consisting of sealer and catalyzed topcoat(s). Sand and wipe clean between coats. Topcoat(s) may be omitted on concealed surfaces.
 - 1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.

2.6 CABINET HARDWARE

- A. General: Provide laboratory casework manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. Hinges: Stainless-steel, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors 48 inches or less in height; 3 for doors more than 48 inches in height.
- C. Pulls: Solid aluminum, stainless steel, or chrome-plated brass; fastened from back with two screws. For sliding doors, provide stainless-steel or chrome-plated recessed flush pulls. Provide 2 pulls for drawers more than 24 inches in width.
- D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches in height.
- E. Drawer Slides: Powder-coated, full-extension, self-closing, heavy-duty drawer slides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; and complying with BHMA A156.9, Type B05091, and rated for 100 lbf.
- F. Label Holders: Stainless steel, aluminum, or chrome plated; sized to receive standard label cards approximately 1 by 2 inches, attached with screws or rivets. Provide on all drawers.
- G. Locks: Cam type with 5-pin tumbler, brass with chrome-plated finish; complying with BHMA A156.11, Type E07281.
 - 1. Provide minimum of two keys per lock and two master keys.
 - 2. Provide on all drawers and doors.
- H. Adjustable Shelf Supports: Pin-type, corrosion-resistant coated shelf support clips for mounting on interior of cabinet work, to retain shelves from accidental removal. Shelves shall be adjustable on 2-inch centers. Surface mounted metal support strips and clips subject to corrosion are not acceptable.

2.7 COUNTERTOPS, TROUGHES, AND SINKS

- A. Countertops, General: Provide units with smooth surfaces in uniform plane free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of 1 inch, with continuous drip groove on underside 1/2 inch from edge.
- B. Sinks, General: Provide sizes indicated or laboratory casework manufacturer's closest standard size of equal or greater volume, as approved by Architect.
 - 1. Outlets: Provide with strainers and tailpieces, NPS 1-1/2, unless otherwise indicated.
 - 2. Overflows: For each sink except cup sinks, provide overflow of standard beehive or open-top design with separate strainer. Height 2 inches less than sink depth. Provide in same material as strainer.
- C. Epoxy Countertops, Troughs, and Sinks: Factory molded of modified epoxy-resin formulation with smooth, nonspecular finish.

1. Physical Properties:
 - a. Flexural Strength: Not less than 10,000 psi.
 - b. Modulus of Elasticity: Not less than 2,000,000 psi.
 - c. Hardness (Rockwell M): Not less than 100.
 - d. Water Absorption (24 Hours): Not more than 0.02 percent.
 - e. Heat Distortion Point: Not less than 260 deg F.
 2. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
 - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
 - b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
 3. Color: Black.
 4. Countertop Fabrication: Fabricate with factory cutouts for sinks and with butt joints assembled with epoxy adhesive and prefitted, concealed metal splines.
 - a. Countertop Configuration: Flat, 1 inch thick, with rounded edge and corners, and with drip groove and integral coved backsplash.
 - b. Countertop Construction: Uniform throughout full thickness.
 - c. Countertop to have grooved drainage sloped to sink - 16" each side of sink.
 5. Table Top Configuration: Raised (marine) edge, 1-1/4 inch thick at raised edge, with rounded edge and corners, and with integral coved backsplash.
 6. Sink Fabrication: Molded in 1 piece with smooth surfaces, coved corners, and bottom sloped to outlet; 1/2-inch minimum thickness.
 - a. Provide with polypropylene strainers and tailpieces.
- D. Cup Sinks: Material and size as indicated.
1. Provide epoxy cup sinks with polypropylene strainers and integral tailpieces.
- E. Troughs: Epoxy. Comply with requirements for materials and construction as specified for countertops and sinks. Pitch to drains not less than 1/8 inch/foot.
1. Outlets: Except where troughs empty into sinks, provide NPS 1-1/2 outlets with strainers and tailpieces.
 2. Provide epoxy troughs with polypropylene strainers and tailpieces.

2.8 ACCESSORIES

- A. Reagent Shelves: Provide as indicated, fabricated from same material as adjacent countertop, unless otherwise indicated.
- B. Pegboards: Polypropylene, epoxy, or phenolic-composite pegboards with removable polypropylene pegs and stainless-steel drip troughs with drain outlet.

2.9 PLUMBING AND ELECTRICAL FIXTURES

- A. Plumbing piping, fixtures, and appurtenances are specified in other sections; Contractor is to coordinate with products to be provided under those sections for all penetrations and cuts in the countertops.
- B. Safety showers and eyewashes shall be provided in materials as standard with catalog number specified. Safety showers and eyewashes shall be furnished assembled for final installation or mounting by others.
- C. Pedestal electric boxes, cast aluminum finished in black textured coating furnished with tank nipples and locknuts for attachment to countertops.

1. Electrical boxes mounted in table or cabinet aprons shall be steel.
 2. Electric receptacles, switches, etc., shall be specification grade 20 amp and UL approved. Receptacles located within 6'0" of sinks to be G.F.I. type.
 3. Cover plates for receptacles shall be stainless steel.
- D. Mounting of electric boxes in table aprons or cabinet units shall be by Casework Manufacturer

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of wood laboratory casework.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

- A. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Base Cabinets: Adjust top rails and subtops within 1/16 inch of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 24 inches o.c. Fasten adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches o.c. and at sides of cabinets with not less than 2 fasteners per side.
- C. Wall Cabinets: Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches o.c. Align similar adjoining doors to a tolerance of 1/16 inch.
- D. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- E. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF COUNTERTOPS

- A. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where shown on Shop Drawings.
- B. Field Jointing: Where possible, make in the same manner as shop jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop.
1. Use concealed clamping devices for field joints in plastic-laminate countertops. Locate clamping devices within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.
- C. Fastening:
1. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches o.c.
 2. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.

- D. Provide required holes and cutouts for service fittings.
- E. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.
- F. Provide scribe moldings for closures at junctures of countertop, curb, and splash, with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.
- G. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.4 INSTALLATION OF SINKS

- A. Underside Installation of Epoxy Sinks: Use laboratory casework manufacturer's recommended adjustable support system for table- and cabinet-type installations. Set top edge of sink unit in sink and countertop manufacturers' recommended chemical-resistant sealing compound or adhesive and firmly secure to produce a tight and fully leakproof joint. Adjust sink and securely support to prevent movement. Remove excess sealant while still wet and finish joint for neat appearance.

3.5 INSTALLATION OF ACCESSORIES

- A. Install accessories according to Shop Drawings and manufacturer's written instructions.
- B. Securely fasten pegboards to partition framing, wood blocking, or reinforcements in partitions.

3.6 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- B. Protect countertop surfaces during construction with 6-mil plastic or other suitable water-resistant covering. Tape to underside of countertop at minimum of 48 inches o.c.

END OF SECTION

SECTION 12 36 00 - COUNTERTOPS**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Countertops for architectural cabinet work.
- B. Countertops for manufactured casework.
- C. Wall-hung counters and vanity tops.
- D. Sinks molded into countertops.
- E. Epoxy resin sinks.
- F. Window sills; solid surface.

1.2 RELATED REQUIREMENTS

- A. Section 06 41 00 - Architectural Wood Casework.
- B. Section 12 35 50 - Educational Casework.

1.3 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2014.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- D. AWI/AWMAC (QSI) - Quality Standard Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- E. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- F. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- G. PS 1 - Structural Plywood; 2009.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- F. Sustainable Design Submittal: Documentation for sustainably harvested wood-based components.
- G. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

- H. Reports: Provide documentation of VOC content in g/L for adhesives applied within the building waterproofing envelope; document no added urea formaldehyde for composite wood, agrifiber products and laminating adhesives.
- I. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Same fabricator as for cabinets on which tops are to be installed.
- B. Installer Qualifications: Fabricator.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD 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.

PART 2 PRODUCTS

2.1 COUNTERTOPS

- A. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
 - 1. Laminate Sheet: NEMA LD 3, Grade HGS, HGS, 0.048 inch nominal thickness.
 - a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - b. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
 - c. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1) As selected by Architect from laminate manufacturer's full range in solid colors, wood grains, and patterns, including stone, marble and leathers.
 - 2) Ten different colors may be selected by Architect for this Project.
 - d. Manufacturers:
 - 1) Formica Corporation : www.formica.com.
 - 2) Lamin-Art, Inc : www.laminart.com.
 - 3) Panolam Industries International, Inc\Nevamar : www.nevamar.com.
 - 4) Panolam Industries International, Inc\Pionite : www.pionitelaminates.com.
 - 5) Wilsonart International, Inc : www.wilsonart.com.
 - 2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with 3mm polyvinylchloride (PVC), machine applied with hot melt adhesive, inside/outside length radiused, corner radiused and buffed.
 - a. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.

3. Back and End Splashes: Same material, same construction.
 4. Fabricate in accordance with AWI/AWMAC Quality Standards Illustrated Premium Grade.
- B. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
1. Flat Surface Thickness: 1 inch, nominal.
 2. Flammability: Self-extinguishing, when tested in accordance with ASTM D635.
 3. Surface Finish: Smooth, non-glare.
 4. Color: Black.
 5. Exposed Edge Shape: 3/16 inch radius corner.
 6. Back and End Splashes: Same material, same thickness; separate for field attachment.
 7. Sinks: Same material, same color; integrally molded with counter; bottom sloped to outlet; molded outlets; drain outlet located in back corner.
 - a. Sides and Ends: 1/2 inch minimum thickness.
 - b. Bottoms: 5/8 inch minimum thickness.
 - c. Interior Corners: 1 inch minimum radius.
 - d. Clamping collars for 1-1/2 or 2 inch diameter waste pipe, for sealed but not permanent connection.
 - e. Steel channel supports front to back on each side, fastened to underside of top to support twice full sink weight.
 8. Fabricate in accordance with manufacturer's standard requirements.
- C. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
1. Flat Sheet Thickness: 1/4 inch, minimum.
 2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
 - c. Color and Pattern: To be selected from manufacturer's full line.
 - d. Manufacturers:
 - 1) Dupont : www.corian.com.
 - 2) Formica Corporation : www.formica.com.
 - 3) Avonite Surfaces : www.avonitesurfaces.com.
 - 4) Wilsonart International, Inc : www.wilsonart.com.
 3. Other Components Thickness: 1/2 inch, minimum.
 4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.
 5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
 6. Skirts: As indicated on drawings.

2.2 MATERIALS

- A. Wood-Based Components:
1. Wood fabricated from old growth timber is not permitted.
 2. Composite Wood and Agrifiber Products: No added urea formaldehyde.

- B. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; joint lengths using metal splines.
- C. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 47 pcf minimum density; minimum 3/4 inch thick; joint lengths using metal splines.
- D. Backer Sheet: Provide substrate with laminate backer sheet.
- E. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined, containing no added urea formaldehyde resins.

2.3 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 - 1. Join lengths of tops using best method recommended by manufacturer.
 - 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 - 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 - 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 - 2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
 - 1. Integral sinks: Shop-mount securely to countertop with adhesives, using flush configuration, as per manufacturer's instructions, and as detailed on drawings.
 - 2. Sills: Fabricate to Drawing detail.
- D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.
 - 1. Wall Brackets: Provide aluminum or steel brackets surface mounted at masonry walls and recess mounted at gypsum board walls.
 - a. Basis-of-Design: "Rakks" Counter Brackets - L-shaped bracket fabricated from aluminum T sections; Model No. EH-1818 and EH-1824 as manufactured by Rangine Corporation.
 - 1) Load capacity per bracket: 450 pounds.
 - 2) Finish: Powder coated, color as selected by Architect.
 - 3) Provide with 5/8 inch opening rubber grommet installed in 7/8 inch hole.
 - b. Other approved manufacturer:
 - 1) A&M Hardware Inc.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

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.

3.3 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
- C. Attach epoxy resin countertops using compatible adhesive.
- D. Seal joint between back/end splashes and vertical surfaces.

3.4 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.5 CLEANING AND PROTECTION

- A. Clean countertops surfaces thoroughly.
- B. Protect installed products until completion of project.
- C. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 12 48 13 - ENTRANCE FLOOR MATS AND FRAMES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Roll-up mats.
- B. Recessed mat frames.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating properties of walk-off surface, component dimensions, recessed frame characteristics and profiles, and finishes.
- C. Shop Drawings: Indicate dimensions, details for recessed frame, and divisions between mat sections.
 - 1. For recessed frames located within a dimensionally restricted area, show dimensions of space within which the frame will be installed.
- D. Samples for Initial Selection: For each type of product indicated.
- E. LEED Submittals: Comply with Section 018113.
 - 1. MR Credit 3: BPDO - Sourcing of Raw Materials
 - a. For recycled content floor grille: Documentation indicating percentages by weight pre-consumer and post-consumer recycled content. Include material cost value.
 - 2. MR Credit 4: BPDO - Material Ingredients
 - a. For floor system: Material Ingredient Report.
- F. Maintenance Data: Include cleaning instructions and stain removal procedures.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain floor mats and frames through one source from a single manufacturer.
- B. Accessibility Requirements: Provide installed floor mats that comply with most stringent requirements of Section 4.5 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)" and Sections 302 and 303 in ICC A117.1.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Shop Drawings.

1.5 COORDINATION

- A. Coordinate size and location of recesses in concrete with installation of finish floors to receive floor mats and frames.

PART 2 PRODUCTS**2.1 MATS**

- A. Roll-Up, Aluminum-Rail Hinged Mats: Extruded-aluminum tread rails 1-1/2 inches wide by 3/8 inches thick, sitting on continuous vinyl cushions.
 - 1. Tread Inserts: 32-oz./sq. yd. weight, fusion-bonded solution-dyed polypropylene carpet.
 - 2. Rail Color: Clear.

3. Hinges: Aluminum.
 4. Mat Size: As indicated.
 5. Products:
 - a. American Floor Products Company, Inc.; Stratoflex III Foot Grid System.
 - b. C/S Group; Product Pedimat.
 - c. Musson, R. C. Rubber Co.; Product EM-800.
 - d. Pawling Corporation; Architectural Products Division; Product EM-800 Rol-Dek.
- B. Recessed Frame:
1. Extruded Aluminum: ASTM B 221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52.
 2. Color: Clear anodized.

2.2 CONCRETE FILL AND GROUT MATERIALS

- A. Provide concrete grout and fill equivalent in strength to cast-in-place concrete slabs for recessed mats and frames. Use aggregate no larger than one-third fill thickness.

2.3 FABRICATION

- A. Construct recessed mat frames square, tight joints at corners, rigid. Coat surfaces with protective coating where in contact with cementitious materials.
- B. Fabricate mats in single unit sizes; fabricate multiple mats where indicated. Do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and floor conditions for compliance with requirements for location, sizes, minimum recess depth, and other conditions affecting installation of floor mats and frames.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Mats: Verify size of floor recess before fabricating mats.
- B. Vacuum clean floor.

3.3 INSTALLATION

- A. Install frames to achieve flush plane with finished floor surface and comply with manufacturer's written instructions.
- B. Coordinate top of mat surfaces with bottom of doors that swing across mats to provide clearance between door and mat.
- C. Install walk-off surface in floor recess flush with finish floor after cleaning of finish flooring.
1. Install necessary shims, spacers, and anchorages for proper location and secure attachment of frames.
 2. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.

3.4 PROTECTION

- A. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION

SECTION 12 66 13 - TELESCOPING STANDS**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes wall-attached telescoping stands.

1.2 DESIGN REQUIREMENTS

- A. Telescopic gymnasium seating will be designed to support a vertical live load of 100 pounds per square foot, but not less than 120 pounds per lineal foot on both seat boards and footboards; seating shall also be designed to carry a horizontal sway force of 24 pounds per lineal foot parallel to the seating and 10 pounds per lineal foot perpendicular to the seating.
- B. No section length greater than 27'-0" for wall attached units is permitted.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for telescoping stands.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Include structural analysis data signed and sealed by the qualified professional engineer, licensed in the State of Maryland, responsible for their preparation.
- C. Samples for Initial Selection: For each type of exposed finish required.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - 1. Decking: 3-inch- square samples of finished material.
 - 2. Metal Components: 3-inch- square sample of each color and finish indicated.
 - 3. Seating: 3-inch- square sample of each seating material and finish indicated.
- E. Qualification Data: For Installer.
- F. Operation and Maintenance Data: For telescoping stands to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Manufacturer's Engineering Responsibility: Preparation of data for telescoping stands, including Shop Drawings, and comprehensive engineering analysis by a qualified professional engineer.
- C. Safety Standard: Provide telescoping stands that comply with requirements in NFPA 102.
- D. Welding: Qualify procedures and personnel according to AWS D1.1 "Structural Welding Code - Steel" and AWS D1.3 "Structural Welding Code - Sheet Steel."
- E. Accessibility Requirements: Provide telescoping stands that comply with requirements in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)".
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls, columns, and other construction that will interface with telescoping stands by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 EXTRA MATERIALS

- A. Provide eight extra seats and front panels.

1.7 WARRANTY

- A. Manufacturer's Product Warranty: Submit manufacturer's standard warranty form for telescoping bleachers. This warranty is in addition to, and not a limitation of other rights Owner may have under Contract Documents.
 - 1. Warranty Period: Five years from Date of Acceptance.

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. Hussey Seating Company.
 - 2. Interkal LLC.
 - 3. Irwin Folding Bleacher Company.
- B. Design to incorporate recoverable ADA seating spaces which require no front railing.
 - 1. Base Bid: Power to be located under row 2 of the 17 row bank, to allow the necessary number of ADA spaces.
 - 2. Alternate Bid: Power to be located under row 1 of the 8 row bank.

2.2 MATERIALS

- A. Wood:
 - 1. Plywood: APA grade trademarked, DOC PS 1.
- B. Steel:
 - 1. Structural Steel Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - 2. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coating designation.
 - 3. Uncoated Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold-rolled commercial steel), or ASTM A 1011/A 1011M, Designation CS (hot-rolled commercial steel).
 - 4. Tubing: ASTM A 500, cold formed; ASTM A 501, hot formed; or ASTM A 513, mechanical.
- C. Extruded Aluminum: ASTM B 221, alloy as standard for manufacturer.
- D. Polyethylene Plastic: High-density polyethylene; molded, color-pigmented, textured, impact-resistant, structural formulation.

2.3 TELESCOPING STANDS

- A. Description: Operable systems of multiple-tiered seating on interconnected folding platforms that close, without being dismantled, into a nested stack for storing or moving. Stand units permit opening and closing of adjacent rows, allow individual and collective rows to be locked open for use, and close with vertical faces of upper skirts on the same vertical plane.
- B. Wall-Attached Telescoping Stands.

-
- C. Operation:
 - 1. Main Gymnasium: Electrically operated.
 - D. Main Gymnasium - 2 Banks:
 - 1. Depth per Row: (measured horizontally from front edge of one seaboard to front edge of the next seaboard) 22".
 - 2. Tiers:
 - a. As indicated on the drawings.
 - 3. Net Capacity:
 - a. As indicated on the drawings.
 - 4. Row Rise: 9-5/8 inches.
 - 5. Aisle Width: As indicated on the drawings.
 - E. Bench Seats and Skirts:
 - 1. Material: Molded polyethylene plastic with contour seat surface.
 - a. Colors: As selected by Architect from manufacturer's standard; Architect reserves the right to select multiple colors in pattern to be provided later.
 - 2. Bench Modules: 18 inches long unitized, interlocking, engineered, high density injection molded polyethylene modules providing scuff-resistant textured 10 inch wide anatomically contoured seat surface, with face designed to accept seat number plates. Seat and face shall incorporate a 2 inch minimum interlock.
 - 3. Profile: Designed with internal reinforcement ribs and cantilevered to the rear to provide not less than 3 inches smooth toe space beneath the seat.
 - 4. End Caps:
 - a. Each end of row shall be enclosed with matching end caps.
 - b. End caps shall be designed with concealed attachment and provide indent for row letters.
 - c. Color to match seat top.
 - F. Deck: Plywood.
 - 1. Finish: Two coats of polyurethane to provide a clear transparent finish.
 - G. Risers: Steel sheet with manufacturer's standard rust-inhibiting coating or hot-dip galvanized finish.
 - H. Rails: Structural steel, finished with manufacturer's standard powder coat system.
 - 1. Color: Black.
 - I. Understructure: Structural steel.
 - 1. Finish: Manufacturer's standard rust-inhibiting finish.
 - 2. Color: Manufacturer's standard.
 - J. Support Column Wheels: Nonmarring, soft, rubber-face wheel assembly under each support column.
 - 1. Include wheels of size, number, and design required to support stands and operate smoothly without damaging the flooring surface, as standard by manufacturer.
 - K. Fasteners: Vibration proof, in manufacturer's standard size and material.
 - L. Accessories:
 - 1. Slip-resistant, abrasive tread surfaces at vertical aisles.
 - 2. Intermediate and front aisle steps, fully enclosed, at each vertical aisle.
 - 3. Store-in-place Aisle Handrails: Provide single pedestal mount handrails 34 inches high with terminating mid-rail.
 - a. Nose-mounted.
 - b. Closed-loop handrail.
-

4. End rails (guards) that are telescoping and self-storing.
5. Rear fillers including supports for closing openings between top row and rear wall of adjoining construction.
6. Manufacturer's standard partially open wall brackets to hold the Base Bid stands to open only 5 rows.
7. Scorers Table that stows away in bleacher system; quantity 1.

2.4 FABRICATION

- A. Fabricate understructure from structural steel members in size, spacing, and form required to support design loads specified in referenced safety standard.
- B. Weld understructure to comply with applicable AWS standards.
- C. Round corners and edges of components and exposed fasteners to reduce snagging and pinching hazards.
- D. Form exposed sheet metal with flat, flush surfaces, level and true in line, and without cracking and grain separation.
- E. Seating Supports: Fabricate supports to withstand, without damage to components, the forces imposed by use of stands without failure or other conditions that might impair the usefulness of seating units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas where telescoping stands are to be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install telescoping stands to comply with referenced safety standard and manufacturer's written instructions.

3.3 ADJUSTING AND CLEANING

- A. On completion of installation, lubricate, test, and adjust each telescoping stand unit so that it operates according to manufacturer's written operating instructions.
- B. Clean installed telescoping stands on exposed and semiexposed surfaces. Touch up shop-applied finishes or replace components as required to restore damaged or soiled areas.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain telescoping stands. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 13 21 48 - SOUND-CONDITIONED MUSIC PRACTICE ROOMS**PART 1 GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
1. Modular sound-isolating enclosures; standard module including:
 - a. Perimeter neoprene floor seal
 - b. Door with vision light
 - c. Corner posts with integrated speakers enclosures and wiring
 - d. Wall panels with integrated wiring and mountings for microphones
 - e. Ceiling frame
 - f. Ceiling panels
 - g. Integrated ventilation, illumination, system control and power and signal distribution systems
 - h. Access raceways for signal distribution systems.
- B. Related Sections:
1. Division 15 Sections for connection to HVAC system.
 2. Division 16 Sections for electrical outlets with receptacle for power cord.

1.2 DEFINITIONS

- A. Noise Isolation Class (NIC): Single number rating used to describe noise reduction between two spaces through a complete structure. Because NIC is strongly affected by test environment, only NIC measured in strictly controlled independent laboratory environment may be used for comparing sound-isolating enclosures.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements: Modular, sound-isolating enclosures with internal acoustical environments suitable for music instruction and rehearsal, voice announcements and tape recording, private consultations and testimony, and remedial instruction; modular in 15-inch increments; expandable without component modification or loss of acoustical performance; individual panels removable and replaceable with only partial disassembly of module. Modules shall have integrated wiring, speaker enclosures and microphones mounts to allow for upgrade of room to V-Room® (Virtual Acoustics Room) Practice without disassembly. Modules shall be easily demountable and relocated without loss of effectiveness. Wall and ceiling panels will meet Underwriters Laboratory (UL) Class 1 classification per U.L. Standard 723 for flame spread and smoke developed. Modules shall seal to any floor without being physically attached or with the use of caulking. Room electrical system shall be U. L. classified to NEC.
1. Interior Height of Standard Room: 89-3/4 inches.
 2. Module Size: As indicated on the Drawings.
- B. Performance Requirements: Current production units with 410 cubic foot interior volume, 34 percent perforated interior panels, 12-inch airspace between modules, concrete floor construction:
1. Airborne noise reduction, laboratory installation: NIC 40 from exterior to interior of module; NIC 60 from interior of one module to interior of adjacent module.
 2. Airborne noise reduction, typical field installation: NIC 41 from interior to exterior of module and NIC 65 from interior of one module to interior of adjacent module.

3. Ambient noise at center of module, lighting and ventilating systems operating: Not exceeding NC 25.
4. Reverberation time in contiguous octave bands, center frequencies from 125 to 4000 Hz: 0.45 plus or minus 0.1 second (based on a 640 cu. ft. interior volume).
5. Sound absorption coefficients of perforated wall and ceiling panels:

<u>One-third Octave Band Center Frequency (Hz)</u>	<u>Absorption Coefficient (Sabins/sq.ft.)</u>
125	0.57
250	0.98
500	1.13
1000	1.06
2000	1.06
4000	1.03

6. Lighting level: 80 foot-candles at 36 inches above floor at module center.
7. Ventilation system: 50 air changes per hour.

1.4 SUBMITTALS

- A. Product Data: Submit applicable reference standards, current performance data, application recommendations and product limitations, and the U.L. Listing Card.
- B. Shop Drawings: Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, and hardware.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing full range of colors, textures, and patterns available for each type of material exposed to view.
- D. Qualification Data: For Installer.
- E. Product Certificates: For each sound-conditioned music practice room, signed by product manufacturer certifying that product meets performance requirements.
- F. Operation and Maintenance Data: To include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
 1. Installer's responsibilities include supplying and installing sound-conditioned music practice rooms and providing a qualified manufacturer's representative available during the course of the Work to inspect work and consult with Contractor, Architect, and Owner.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of sound-conditioned music practice rooms and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
 1. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

- D. 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.
- E. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201.
 - 1. Subject to compliance with requirements, permanently mark safety glass with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE AND HANDLING

- A. Pack and ship to avoid damage according to manufacturer's recommendations:
 - 1. Finish and assemble all components in the factory before shipment.
 - 2. Ship components in individual, sealed, labeled cartons.
 - 3. Deliver components to room designated for installation.
- B. Do not accept damaged products at the site. Do not install damaged products.
- C. Store products in heated indoor storage near point of installation. Retain protective packaging until installing.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install practice rooms until building is enclosed, wet-work is complete, and HVAC system is operating and the finish floor is in place.
- B. Field Measurements: Where practice rooms are indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes if necessary.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sound-conditioned music practice rooms that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following or an approved substitute:
 - 1. Wenger Corporation.

2.2 STANDARD MANUFACTURED COMPONENTS

- A. Wall Frame: 16 gauge steel channel with 1-1/4 inch thick neoprene pad adjustable plus or minus 3/8 inch to provide seal at floor and to compensate for 3/4 inch maximum variation in floor surface. Frame shall not lag, bolt or screw into building floor surface.
- B. Wall Panels: 15 inches by 30 inches wide and 4 inches thick; exterior face 16 gauge steel; interior face 22 gauge perforated or solid steel; filled with sound absorbing material; acoustical seal by two continuous IsoLoss™ gaskets at perimeter of each panel; alignment and compression seal between panels by mechanical locks. Integrated microphone mounts and wiring located behind perforated wall panels (2 per room). Forced fit, "H" member or friction fit panels not allowed.

- C. Door Panel: Righthand or lefthand, out-swinging or in-swinging, prehung 36-inch door in frame; two inches thick.
 - 1. Exterior Face: 16 gage steel.
 - 2. Interior Face: 14 gage steel; filled with sound-absorbing material; 24 by 76 inches vision light glazed with 1/4 inch and 3/16 inch panes of laminated safety glass, 2 inch air space.
 - 3. Frame: 16 gage tubular steel filled with sound-absorbing material; 16 gauge door insert panels.
 - 4. Double Acoustical Seal: Magnetic and compression seal at head and jambs, adjustable sweep seal at bottom
 - 5. Hardware: Ramped metal threshold, continuous hinge, handicapped approved handle, bumper, schoolhouse function lock.
 - 6. Door STC: 43.
- D. Corner Assembly: Same construction as wall panels; 11-1/2 inches wide on each outside face.
 - 1. Exterior Face: 16 gage steel
 - 2. Interior Face: 22 gage perforated steel. Filled with sound absorbing material; acoustical seal by two continuous Isoloss™ gaskets at perimeter of each panel; alignment and compression seal between panels by mechanical locks.
 - 3. Provide integrated speaker enclosures and wiring in each corner assembly.
- E. Ceiling Panels: 15 inches wide and 4 inches thick; same construction as wall panels. Provide center support beam for ceiling spans greater than 105 inches.
- F. Light Panels: Same construction as ceiling panels; provide fluorescent luminaries with sound level "A" rated, electronic ballasts; all parts UL/CSA-listed. Provide thermal overload protection; 12 foot power cable.
- G. Ceiling Frame: 16 gauge steel channel to align ceiling and wall panels with clamping mechanism to compress ceiling panel acoustical gaskets.
- H. Vent Panel: 15 inches wide by 6 inches thick for intake air through acoustical plenum with 1-1/2 inch sound-absorbing duct liner and four 90 degree bends. Quantity of vent panels equal to quantity of fan panels.
- I. Fan Panel (non-direct connect HVAC systems): Same construction as vent panel with six 90-degree bends; to include 230 cfm exhaust fan, accessible from module interior; 12 foot power cable.
- J. Light/Vent Panels (direct connected HVAC systems): Ceiling vent panel 15 inches wide by 6 inches thick for intake air through acoustical plenum with 1-1/2 inch sound-absorbing duct liner and four 90 degree bends; 8-inch round duct connection. Use only flex duct for connection (to maintain sound isolation). Provide fluorescent luminaries with sound level "A" rated.
- K. Power Panel: Same construction as wall panels; junction and electrical boxes with airtight cover plates.
 - 1. Interior: One four-plex receptacles, toggle switches labeled "LIGHT", "AIR" and "SYSTEM" to control luminaire, fan and future V-Room® Practice active acoustics; two four-plex boxes located 8 inches from the ceiling with two double cover plates for connections for alarms, warning devices, smoke detectors, etc.
 - 2. Exterior: Three power receptacles; signal wiring raceway through 30-inch length 3/4 inch of conduit dropping vertically between exterior and interior junction boxes; 20 foot power cable; integrated wiring and access plate for future upgrade to V-Room® Practice. Electrical components shall be UL/CSA listed.
- L. Finishes:
 - 1. Hardware and Electrical Cover Plates: Satin chrome.

2. Other Components: Iron phosphate precoat and epoxy powder thermoset (baked) finish.
3. Colors: To be selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

- A. Window Panel: Same construction and interchangeable with wall panels.
 1. 30-inch Panel: 24-inch by 76-inch vision light
 2. Glass: 1/4- and 3/16-inch laminated safety glass with 2 inch air space.
- B. Communication Panel (Additional locations for outlets, phone jacks, fire alarms, data connections, etc.): Same construction as wall panels.
 1. Interior: Four double junction boxes, two located 8 inches from the ceiling, two located 15 inches from the floor with airtight cover plates, one double cover plate and one single cover plate at each location
 2. Exterior: Two double junction boxes, one located 13-1/2 inches from the top of panel, one located 6-1/2 inches from the bottom of panel. Interior pair of boxes is connected to its corresponding exterior box and to each other with 3/4 inch conduit.
 - a. Top and bottom assemblies are not connected together.
- C. Closure Panel: Provide visual closure between modules without transmitting sound from one module to another; 1/2-inch-thick thermoset composite wood with flexible gasketing.
 1. Color: Oyster.
- D. Horizontal Enclosure Panel: Provide visual closure between top of modules and bulkhead wall above; 1/2-inch-thick thermoset composite wood with flexible gasketing.
 1. Color: Oyster.

2.4 FABRICATION

- A. Fabricate components completely in factory. Field modification of components is not permitted.
- B. Preglaze doors at factory.
- C. Prewire music practice rooms at factory, ready for connection to service at Project site.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for, installation tolerances, and other conditions affecting performance of work.
- B. Verification of Conditions: Confirm that substrate floor is flat within 1/4 inch measured from a 10 foot straight-edge. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Ceiling Clearance:
 1. Modules with direct connect HVAC:
 - a. Standard Height Module Minimum Clearance: 127 inches.

3.2 INSTALLATION

- A. Install music practice rooms in accordance with manufacturer's written instructions.
- B. Assemble and install modules without the use of calking or other wet sealants, fillers, insulation, rivets, or sheet metal screws.
- C. Field modification, cutting, fitting and wiring is not permitted.

3.3 ADJUSTING

- A. Adjust all gaskets, seals and hardware for maximum performance.

3.4 CLEANING

- A. Clean all surfaces according to manufacturer's recommendations.
- B. Remove all packaging and construction rubbish and debris.
- C. Protect materials and installed sound-conditioned rooms from damage by work of other trades.

END OF SECTION

SECTION 14 24 00 - HYDRAULIC ELEVATORS**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section specifies hydraulic elevators; passenger and service elevator.
 - 1. Service Elevator: A passenger elevator that is also used to carry freight.
- B. Work Required:
 - 1. The work required under this section consists of all labor, materials and services required for the complete installation (including operational verification) of all the equipment required for the elevator(s) as herein specified.
 - 2. All work shall be performed in a first class, safe and workmanlike manner.
 - 3. In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make complete installation.
- C. Products provided under separate Section:
 - 1. Hoist Beam
 - 2. Pit Ladder
 - 3. Elevator Sump Grate
- D. Work Supplied Under Other Sections:
 - 1. Temporary lighting, including temporary lighting in hoistway for machine space with switch located in hoistway on the strike jamb side of top landing door.
 - 2. Hoistway ventilation shall be in accordance with local and national building code requirements.
 - 3. Guide Rail Support shall be structurally adequate to extend from pit floor to top of hoistway, with spans in accordance with requirements of authority having jurisdiction and final layouts.
 - 4. Removable barricades at all hoistway openings, in compliance with OSHA 29 CFR 1926.502 in addition to any local code requirements.
 - 5. Lifeline attachments capable of withstanding 5000 lb load in accordance with OSHA 29 CFR 1926.502. Provide a minimum of 2 at the top, front of each hoistway.
 - 6. Pit lighting: Fixture with switch and guards. Provide illumination level equal to or greater than that required by ASME A17.1/CSA B44 2000, or applicable version.
 - 7. Control space lighting with switch. Coordinate switch with lighting for machine space as allowable by code.
 - 8. Access Doors: As required for access to governor. Access door shall be self-closing, self-locking if necessary and operable from the inside without a key.
- D. Applicable Codes: Comply with applicable building and elevator codes at the project site, including but not limited to the following:
 - 1. ANSI A117.1, Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People.
 - 2. ADAAG, Americans with Disabilities Act Accessibility Guidelines.
 - 3. ANSI/NFPA 70, National Electrical Code.
 - 4. ANSI/NFPA 80, Fire Doors and Windows.
 - 5. ASME/ANSI A17.7, Safety Code for Elevators and Escalators.
 - 6. ANSI/UL 10B, Fire Tests of Door Assemblies.

7. EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity"
8. Phone line monitoring in conformance with ASME 2009 elevator codes, including audible alarm.
9. Local Building Codes.
10. All other local applicable codes.

1.2 SYSTEM DESCRIPTION

- A. Equipment Description: Machine Roomless Holeless Hydraulic Elevator.
- B. Equipment Control: Elevonic® Control System.
- C. Quantity of Elevators: 1
- D. Number of Stops: 2
- E. Openings: 2 front & 0 rear openings.
- F. Travel: Refer to Drawings.
- G. Rated Capacity: 3500 lb.
- H. Rated Speed: 100 fpm.
- I. Platform Size: 6'-6 3/4" W x 4'-11 1/8" D
- J. Clear Inside Dimensions: 6'-5 9/16" W x 4'-3 9/16" D
- K. Cab Height: 7'-9"
- L. Clear Cab Height: 7'-4 3/8" with 5/16" floor recess and dropped 6 LED ceiling.
- M. Entrance Type and Width: Single-Slide Door 3' 6"
- N. Entrance Height: 7' 0"
- O. Main Power Supply: Refer to electrical drawings, 3-Phase, 60Hz + or - 5% of normal, three-Phase, with a separate equipment grounding conductor.
- P. Car Lighting Power Supply: 120 Volts, Single-phase, 15 Amp, 60 Hz.
- Q. Machine and Controller Location: Remote machine room.
- R. Signal Fixtures: Manufacturer's standard with stainless steel metal button targets.
- S. Stopping Accuracy: ±1/4" (6.4 mm) under any loading condition or direction of travel.
- T. Protection Pads: Include 1 set of protections pads and hooks.
- U. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.
- V. Operating Features
 1. Full Collective Operation
 2. Anti- nuisance.
 3. Fan and Light Protection.
 4. Load Weighing Bypass.
 5. Independent Service.
 6. Firefighters' Service Phase I and Phase II.
 7. Top of Car Inspection.

8. Remote elevator monitoring REM ready.

W. Door Control Features:

1. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
2. Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.
3. Door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening.
4. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

X. Provide equipment according to seismic zone: 1.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each system proposed for use. Include the following:

1. Signal and operating fixtures, operating panels and indicators.
2. Cab design, dimensions and layout.
3. Hoistway-door and frame details.
4. Electrical characteristics and connection requirements.
5. Expected heat dissipation of elevator equipment in hoistway (BTU).
6. Color selection chart for Cab and Entrances.

B. Shop Drawings: Submit approval layout drawings. Include the following:

1. Car, guide rails, buffers and other components in hoistway.
2. Maximum rail bracket spacing.
3. Maximum loads imposed on guide rails requiring load transfer to building structure.
4. Clearances and travel of car.
5. Clear inside hoistway and pit dimensions.
6. Location and sizes of access doors, hoistway entrances and frames.

C. LEED Submittals: Comply with Section 018113.

1. EQ Credit 2: Low-Emitting Materials

- a. For interior wet-applied adhesives, sealants, paints, coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 and VOC content in g/L.
- b. For resilient flooring: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010 or Resilient Floor Covering Institute's (RFCI) FloorScore Certification.
- c. For composite wood: Documentation indicating no added formaldehyde resins or compliance with California Air Resources Board (CARB) Airborne Toxic Control Measures (ATCM) for ultra-low-emitting formaldehyde (ULEF) resins.

D. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.

E. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:
 - a. Diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.
- F. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
 1. As required by Maryland State law, the Contractor must have a Qualified Elevator Inspector conduct the required inspection prior to the State elevator inspection.
 2. Include all necessary third-party inspections required prior to the State elevator inspection, within the Contract.
 3. The cost of the State inspection call-backs or additional third-party inspections, resulting from additional or missed items following the initial third-party inspection, will not be an additional cost to the Owner.
- G. Field Quality Control Certificate: Final inspection and maintenance certificate specified in this Section.
- H. Warranty: Special warranty specified in this Section.
- I. Continuing Maintenance Proposal: Service agreement specified in this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Elevator manufacturer shall be ISO 9001 certified.
- B. Installer: Elevators shall be installed by the manufacturer.
- C. Inspection and Testing: In accordance with requirements of local jurisdiction, obtain required permits, inspections and tests.
- D. Source Limitations: Obtain elevators through one source from a single manufacturer. Only elevator systems and components manufactured in the United States are acceptable for use on this Project.
- E. Regulatory Requirements: Comply with ASME A17.1.
 1. Elevator importance factor is 1.0.
- F. Accessibility Requirements: Comply with Section 4.10 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
- G. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.
- H. Product Requirements:
 1. Adhesive and sealants used on the interior of the building must meet SCAQMD and aerosol adhesives that meet Green Seal Standard GS-36.
 2. Bonding agent for composite wood products cannot contain added urea- formaldehyde.

1.5 DELIVERY, STORAGE AND HANDLING

- A. If the construction site is not prepared to receive the elevator equipment at the agreed ship date, the General Contractor shall be responsible to provide a safe, dry, and easily accessible storage

area on or off the premises. Additional labor costs for double handling will be the responsibility of the general contractor.

- B. Delivered elevator materials shall be stored in a protected environment in accordance with manufacturer recommendations. A minimum storage area of 10 feet by 20 feet is required adjacent to the hoistway.

1.6 COORDINATION

- A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete or masonry for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.
- B. Furnish well casing and coordinate delivery with related excavation work.
- C. Coordinate sequence of elevator installation with other work to avoid delaying the Work.
- D. Coordinate locations and dimensions of other work relating to elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

1.7 WARRANTY

- A. Provide manufacturer warranty for a period of two years. The warranty period is to begin upon Substantial Completion of the Contract. Warranty covers defects in materials and workmanship. Damage due to ordinary use, vandalism, improper or insufficient maintenance, misuse, or neglect do not constitute defective material or workmanship.
 - 1. Notification: Notify Owner, in writing, 60 days in advance of date of expiration of warranty. Failure to notify Owner by required time shall automatically extend warranty to 60 days after written notification is received by Owner at no additional cost to Owner. Extended warranty period shall be considered part of, and manufacturer is fully responsible for Work described in original warranty.
 - 2. Warranty Claim: Warranty claims made by Owner prior to expiration of warranty shall be satisfied even though the warranty has subsequently expired.

1.8 MAINTENANCE AND SERVICE

- A. Non Restricted, Non Proprietary: Provide non restricted and non proprietary components and parts.
 - 1. Do not provide any components and parts restricted only to manufacturer's authorized service contractors.
 - 2. Provide only components and parts which can be purchased without approval from any one: elevator manufacturer, elevator installer, authorities having jurisdiction, or anyone else.
- B. Maintenance service consisting of regular examinations and adjustments of the elevator equipment shall be provided by the elevator contractor for a period of 2 years after the elevator has been turned over for the customer's use. This service shall not be subcontracted but shall be performed by the elevator contractor. All work shall be performed by competent employees during regular working hours of regular working days. This service shall not cover adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents caused by persons other than the elevator contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.

1. Maintenance Parts and Materials: Non restricted and non proprietary parts and materials available to the general elevator trade and furnished or approved by the elevator manufacturer.
- C. The elevator control system must:
1. Provide in the controller the necessary devices to run the elevator on inspection operation.
 2. Provide on top of the car the necessary devices to run the elevator in inspection operation.
 3. Provide in the controller an emergency stop switch. This emergency stop switch when opened disconnects power from the brake and prevents the motor from running.
 4. Provide the means from the controller to reset elevator earthquake operation.
- D. Provide system capabilities to enable a remote expert to create a live, interactive connection with the elevator system to enable the following functions:
1. Remotely diagnose elevator issues with a remote team of experts
 2. Remotely return an elevator to service
 3. Provide real-time status updates via email
 4. Remotely make changes to selected elevator functions including:
 - a. Control building traffic: Restrict floor access, remove car from group operation, shut down elevator, select up peak / down peak mode, activate independent service
 - b. Conserve energy: Activate cab light energy save mode, activate fan energy save mode, shut down car(s)
 - c. Improve passenger experience: Extend door open times, change parking floor, activate auto car full, activate anti-nuisance, advance door opening, door nudging, extend specific floor extended opening time, release trapped passengers

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide non-proprietary microprocessor operation systems as required to provide type of operation indicated.
- B. Interior wet-applied adhesives, sealants, paints, and coatings: Comply with low-emitting requirements in Division 01 Section "Sustainable Design Requirements - LEED."
- C. Resilient flooring: Comply with California Department of Public Health (CDPH) Standard Method v1.1-2010 or Resilient Floor Covering Institute's (RFCI) FloorScore Certification.
- D. Composite wood: Contain no added formaldehyde resins or comply with the California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) for formaldehyde emissions for ultra-low-emitting formaldehyde (ULEF) resins.

2.2 DESIGN AND SPECIFICATIONS

- A. Basis-of-Design - Otis Elevator Company, Model Hydrofit 3500, with the following components:
 1. Sleep mode operation for LED ceiling lights and car fan.
 2. LED lighting standard in ceiling lights and elevator fixtures.
 3. Sleep mode operation for LED ceiling lights and car fan.
- B. Other Approved Manufacturers:
 1. Delaware Elevator.
 2. Schindler Elevator Corporation.

3. Thyssen Krupp.

2.3 SYSTEM DESCRIPTION

- A. Equipment Description: Machine Roomless Holeless Hydraulic Elevator.
- B. Equipment Control: Elevonic Control System.
- C. Quantity of Elevators: 2
- D. Rated Load: 3,500 lb. and 4,500 lb. (service elevator); refer to Drawings for designations and locations.
- E. Travel, Stops and Openings: Refer to Drawings.
- F. Rated Capacity: 3500 lb.
- G. Rated Speed: 100 fpm.
- H. Cab Height: 7'-9"
- I. Clear Cab Height: 7'-4 3/8" with 5/16" floor recess and dropped 6 LED ceiling.
- J. Entrance Type and Width: Single-Slide Door 3' 6"
- K. Entrance Height: 7' 0"
- L. Main Power Supply: Refer to electrical drawings, 3-Phase, 60Hz + or - 5% of normal, three-Phase, with a separate equipment grounding conductor.
- M. Car Lighting Power Supply: 120 Volts, Single-phase, 15 Amp, 60 Hz.
- N. Machine and Controller Location: Remote machine room.
- O. Signal Fixtures: Manufacturer's standard with stainless steel metal button targets.
- P. Hall Fixtures: Stainless steel.
- Q. Stopping Accuracy: $\pm 1/4"$ (6.4 mm) under any loading condition or direction of travel.
- R. Protection Pads: Include 1 set of protections pads and hooks.
- S. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.
- T. Operating Features
 - 1. Full Collective Operation
 - 2. Anti-nuisance.
 - 3. Fan and Light Protection.
 - 4. Load Weighing Bypass.
 - 5. Independent Service.
 - 6. Firefighters' Service Phase I and Phase II.
 - 7. Top of Car Inspection.
 - 8. Remote elevator monitoring REM ready.
- U. Security Features: Card-reader operation.
 - 1. Provide with card reader connected to the Owner's key card system. Card reader to be mounted in corridor. Elevator operation to be locked out unless a valid card is presented at the card reader.

V. Door Control Features:

1. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
2. Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.
3. Door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening.
4. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

W. Provide equipment according to seismic zone: 1.

2.4 EQUIPMENT: MACHINE COMPONENTS

- A. The hydraulic system shall be of compact design suitable for operation under the required pressure. The power component shall be mounted in the hydraulic-fluid storage tank. The control valve shall control flow for up and down directions hydraulically and shall include an integral check valve. A control section including control solenoids shall direct the main valve and control: up and down starting, acceleration, transition from full speed to leveling speed, up and down stops, pressure relief and manual lowering. All of these functions shall be fully adjustable for maximum smoothness and to meet contract conditions. System to be provided with a low-pressure switch and a shut-off valve.
 1. The entire hydraulic system with hydraulic-fluid storage tank, power component and valves shall be located in the hoistway pit and be easily accessible for maintenance through an access door in the hoistway wall.
- B. A microprocessor-based controller shall be provided, including necessary starting switches together with all relays, switches, solid-state components and hardware required for operation, including door operation, as described herein. A three (3) phase overload device shall be provided to protect the motor against overloading.
 1. The controller shall be located together with the hydraulic system in the hoistway pit and be easily accessible for maintenance through the same access door that is also used for the hydraulic system.
- C. A manual lowering feature shall permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.
- D. Pressure Switch
- E. Low-oil control.

2.5 EQUIPMENT: HOISTWAY COMPONENTS

- A. Plunger(s) and Cylinder(s): Each cylinder shall be constructed of steel pipe of sufficient thickness and suitable for the operating pressure. The top of each cylinder shall be equipped with a cylinder head with a drip ring to collect any oil seepage as well as an internal guide ring and self-adjusting packing. Each plunger shall be constructed of selected steel tubing or pipe of proper diameter machined true and smooth with a fine polished finish. Each plunger shall be provided with a stop ring electrically welded to it to prevent the plunger from leaving the cylinder. Each plunger and cylinder shall be installed plumb and shall operate freely with minimum friction.
- B. Car Guide Rails: Tee-section steel rails with brackets and fasteners.

- C. Polyurethane type buffers shall be used.
- D. Wiring: Wiring for hoistway electrical devices included in scope of the elevator system, hall panels, pit emergency stop switch, and the traveling cable for the elevator car.
- E. Hoistway Entrances:
 - 1. Frames: Entrance frames shall be of bolted construction for complete one-piece unit assembly. All frames shall be securely fastened to fixing angles mounted in the hoistway and shall be of UL fire rated steel.
 - 2. Sills shall be extruded aluminum or bronze finish, or nickel silver finish.
 - 3. Doors: Entrance doors shall be of metal construction with vertical channel reinforcements.
 - 4. Fire Rating: Entrance and doors shall be UL fire rated for 1-1/2 hour.
 - 5. Entrance Finish: Satin stainless steel.
 - 6. Entrance marking plates: Entrance jambs shall be marked with 4" x 4" (102 mm x 102 mm) plates having raised floor markings with Braille located adjacent to the floor marking. Marking plates shall be provided on both sides of the entrance.
 - 7. Sight Guards: sight guards will be furnished with all doors painted to match with painted doors, painted black for stainless steel and gold satin doors.

2.6 EQUIPMENT: CAR COMPONENTS

- A. Car Enclosures: Enameled steel with removable wall panels and removable roof.
 - 1. Front Walls (Return Panels): Stainless steel.
 - 2. Side and Rear Wall Panels: Plastic laminate with stainless steel reveals for passenger elevator; textured stainless steel for service elevator.
 - 3. Doors: Stainless steel; No. 4 finish.
 - 4. Ceiling Type: Dropped flat steel ceiling: Real White (EWO) with 6 LED lights.
 - 5. Handrails: Stainless steel; No. 4 finish.
 - 6. Floor: Prepared to receive scheduled flooring.
 - 7. Provide hooks for protective pads in all cars and a complete set of full-height protective pads, for each elevator.
- B. Emergency Car Lighting: An emergency power unit employing a 6-volt sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car in the event of building power failure.
- C. Fan: A one-speed 120 VAC fan will be mounted to the structural ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. The fan shall be rubber mounted to prevent the transmission of structural vibration and will include a baffle to diffuse audible noise. A switch shall be provided in the car-operating panel to control the fan.
- D. Handrail: Handrails shall be provided on the side and rear walls of the car enclosure. Handrails shall be 3/8" x 2" (9.5 mm x 51 mm) flat tubular handrail with a Brushed Steel.
- E. Threshold: Extruded Aluminum.
- F. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.
- G. Guides: Car roller type guides at the top and the bottom.
- H. Platform: Car platform shall be constructed of metal.
- I. Certificate frame: Provide a Certificate frame with a satin stainless steel finish.
- J. The LED ceiling lights and the fan should automatically shut off when the system is not in use and be powered back up after a passenger calls the elevator and pushes a hall button.

- K. Adhesives, sealants, paints and coatings applied within the building waterproofing envelope: Comply with low-emitting requirements in Section 01 61 16.
- L. Resilient Flooring: Comply with RFCI FloorScore Program.
- M. Composite Wood and Laminating Adhesives (shop and field applied): Contain no added urea formaldehyde resins.

2.7 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A. Car Operating Panel: A car operating panel shall be provided which contains all push buttons, key switches, and message indicators for elevator operation. The car operating panel shall have a satin stainless steel finish.
- B. A car operating panel shall be furnished. It shall contain a bank of round stainless steel, mechanical LED illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served. All buttons to have raised numerals and Braille markings with:
 - 1. Vandal-Resistant, Flush satin stainless steel button with blue LED illuminating center jewel.
- C. The car operating panel shall be equipped with the following features:
 - 1. Raised markings and Braille to the left hand side of each push-button.
 - 2. Car Position Indicator at the top of and integral to the car operating panel.
 - 3. Door open and door close buttons.
 - 4. Inspection key-switch.
 - 5. Elevator Data Plate marked with elevator capacity and car number.
 - 6. Help Button: The help button shall initiate two-way communication between the car and a location inside the building, switching over to another location if the call is unanswered, where personnel are available who can take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
 - 7. Landing Passing Signal: A chime bell shall sound in the car to signal that the car is either stopping at or passing a floor served by the elevator.
 - 8. In car stop switch
 - 9. Firefighter's hat
 - 10. Firefighter's Phase II Key-switch
 - 11. Call Cancel Button
- D. Car Position Indicator: A digital, LED car position indicator shall be integral to the car operating panel.
- E. Hall Fixtures: Hall fixtures shall be provided with necessary push buttons and key switches for elevator operation.
 - 1. Integral Hall fixtures shall feature round stainless steel, mechanical buttons marked to correspond to the landings. Hall fixtures to be located in the entrance frame face or the wall. Buttons shall be in vertically mounted fixture. Fixture shall be satin stainless steel.
 - 2. Vandal-Resistant, Flush satin stainless steel button with blue LED illuminating center jewel.
- F. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound.
- G. Access key-switch at top floor in entrance jamb.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Installation by manufacturer, except as specifically provided for elsewhere by others.
- B. Welded Construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.
- C. Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent transmission of vibrations to structure and thereby eliminate sources of structure-borne noise from elevator system.
- D. Install piping without routing underground, where possible; where not possible, cover underground piping with permanent protective wrapping before backfilling.
- E. Lubricate operating parts of systems as recommended by manufacturer.
- F. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails, for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- G. Grout sills with non-staining, non-shrink grout. Set units accurately aligned with and slightly above finished floor at landings.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: Upon nominal completion of each elevator installation and before permitting use of elevator (either temporary or permanent), perform acceptance tests as required and recommended by Code, and also perform other tests, if any, as required by governing regulations.
- B. Advise Contractor, Owner, Architect and Inspection Department of governing agencies, in advance of dates and times, tests are to be performed on elevators.

3.4 PROTECTION

- A. Installer shall advise contractor of recommended protection facilities and procedures to prevent damage and deterioration of completed elevator work (regardless of whether placed in temporary service) during remainder of construction period. Provide complete inspection and maintenance service for elevators in temporary service, if any, for period of such service.

3.5 INSTRUCTION DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal

procedures to be followed in checking for sources of operational failures or malfunctions.
Confer with Owner on requirements for a complete elevator maintenance program.

- B. The elevator contractor shall make a final check of each elevator operation with the Owner or Owner's representative present prior to turning each elevator over for use. The elevator contractor shall determine that control systems and operating devices are functioning properly.

END OF SECTION