



PROJECT MANUAL

VOLUME 1 (of 2)

Divisions 00 thru 19

Architect's Project Number: 02110.300

Lillington-Shawtown Elementary School Addition/Renovation

855 Old US Hwy 421
Lillington, NC 27546

Harnett County Schools
1008 South 11th Street
Lillington, North Carolina 27546

July 26, 2024
Construction Documents



Set Number: _____

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PROJECT TITLE PAGE

Date July 26, 2024
Construction Documents

Project Identification Lillington-Shawtown Elementary School Addition/Renovation
855 Old US Hwy 421
Lillington, NC 27546

Architect Project No.: 02110.300

Owner Harnett County Schools
1008 South 11th Street
Lillington, NC 27546
Phone: 910-893-8151

Architect SfL+a Architects, PA
333 Fayetteville Street, Suite 225
Raleigh, NC 27601
Phone: 919-573-6350

Structural Engineer Bennett and Pless
5430 Wade Park Blvd, Suite 400
Raleigh, NC 27607
Phone: 919-832-5587

Plumbing Engineer
Mechanical Engineer
Electrical Engineer
Fire Alarm Engineer
Technology Engineer Optima Engineering, PA
1927 South Tryon Street, Suite 300
Charlotte, NC 28203
Phone: 704-338-1292

Civil Engineer Timmons Group
5410 Trinity Road, Suite 102
Raleigh, NC 27607
Phone: 919-866-4938

END OF SECTION

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Architect

SfL+a Architects, PA
NC Corporate Registration
NC Registration Number 50676



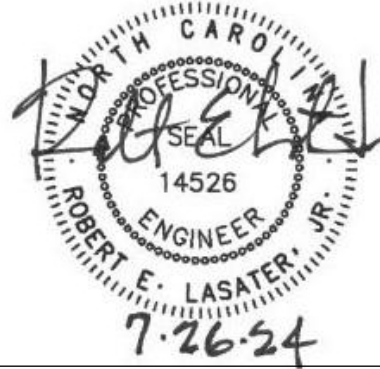
Architect

SfL+a Architects, PA
Robert Ward Ferris
NC Registration Number 6184



Structural Engineer

Bennett & Pless
Robert E. Lasater, Jr.
NC Registration Number 14526



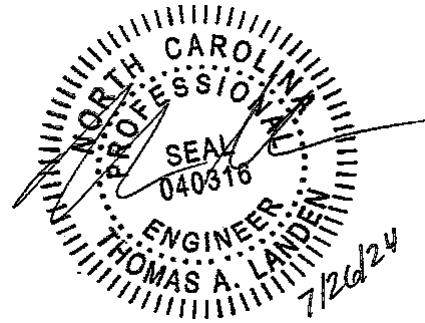
Fire Protection Engineer
Plumbing Engineer

Optima Engineering, PA
Daniel A. Revilla
NC Registration Number 043866



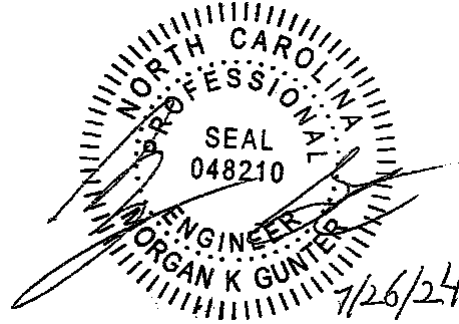
Mechanical Engineer

Optima Engineering, PA
Thomas A. Landen
NC Registration Number 040316



Electrical Engineer
Fire Alarm Engineer

Optima Engineering, PA
Morgan K. Gunter
NC Registration Number 048210



Civil Engineer

Timmons Group
William P. Altman
NC Registration Number 045892



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NOTICE TO BIDDERS

Harnett County Schools invites single prime bids on the project known as the “Lillington-Shawtown ES – Gymnasium Addition”. Sealed bids will be received at the office of the Harnett County School Board of Education, 601 South Main Street, Lillington, NC 27546 , until 3:00 p.m. on Tuesday October 1st, 2024, for the construction of the Lillington-Shawtown ES – Gymnasium Addition. All bids will be opened and read aloud starting at 3:05 PM in the Board Room at the Central Offices building. This project will be bid and awarded in accordance with G.S143-128 and G.S. 143-129.

Work of the Project includes construction of the Lillington-Shawtown ES Gymnasium Addition; a one-story, 10,530 square foot, slab on grade, masonry load-bearing structure with cavity wall construction with brick veneer exterior walls, CMU interior walls, steel trusses and joists, standing seam metal gable roof over gym, and single membrane low-slope roof over lobby / auxiliary spaces. Interior finishes of painted CMU and gypsum board on metal studs, acoustical tile ceilings, VCT / wood / sealed concrete floors, aluminum windows with insulated glass, hollow metal door frames and wood doors. Related site work will include fire loop extension, concrete sidewalks, fire hydrant loop relocation, and various school amenities improvements.

A Pre-Bid Conference will be held on Thursday, September 12th, 2024, at 3:30 p.m. at the Lillington-Shawtown Elementary School facility located at 855 Old US Hwy 421, Lillington, NC 27546 . The meeting will convene at the main entrance to the school. A tour of the building site will take place immediately after check-in. All questions after that time shall be submitted via email to the Design Consultant at SFL+a Architects, 333 Fayetteville Street, Suite 225, Raleigh, North Carolina 27601 via email to: jkonkel@sfla.biz

Contract Documents, including drawings and specifications, may be obtained from the Construction Connect (iSqFt) website at: www.constructionconnect.com, or complete plans and specifications may be examined at the offices of SFL+a Architects, 333 Fayetteville Street, Suite 225, Raleigh, North Carolina 27601 during normal office hours beginning Tuesday, August 27th, 2024. Complete plans and specification may be downloaded from the SFL+a Architects’ ShareFile website by acquiring a link by sending an email to: jkonkel@sfla.biz . Contract documents are also available for review at Harnett County Schools school maintenance offices, 1500 South Main Street, Lillington, NC 27546 during normal business hours – call ahead for availability (910-893-4808).

Each proposal shall be accompanied by a Bid Guarantee of five percent (5%) of the bid in cash, certified check or a fully executed Bid Bond. The deposit shall be retained by the Owner if the successful bidder fails to execute the contract within ten (10) days after award or fails to give satisfactory surety as required herein. (General Statutes of North Carolina, Chapter 143, Article 8, Section 129.) No bid may be withdrawn for a period of ninety (90) days after the opening thereof. The successful bidder will be required to furnish 100% Performance Bond and a 100% Labor and Material Payment Bond.

Bidders are required on school construction and renovation projects covered by N.C. Gen. Stat. 143-128 to make a “good faith effort” to meet minority participation goals. Bidders shall identify on its bid the minority businesses that it will use on the project. Bidders shall submit along with the bid an affidavit listing the good faith efforts it has made pursuant to subsection (f) of G.S. 143-128.2 and the total dollar value of the bid that will be performed by the minority businesses. A bidder that performs all of the work under the contract with its own workforce may submit an affidavit to that effect in lieu of the aforementioned affidavit otherwise required under this subsection.

The Harnett County Schools reserves the right to reject any and all bids, waive informalities and irregularities in bidding, and to accept bids that are considered to be in the best interest of the School System.

END OF DOCUMENT

SECTION 00 21 13
INFORMATION FOR BIDDERS

A-1. SUBMISSION OF BIDS AND BID OPENING:

- A. Bids will be received by Harnett County Schools and will be opened and read at the times and places set forth in the solicitation. Bidders, or their representative, and other interested persons may be present at the opening of proposals.
- B. The envelopes containing the bids must be sealed and addressed to Harnett County School Board of Education, 601 South Main Street, Lillington, NC 27546 and marked on the outside of the envelope Proposal for Harnett County Schools - Lillington-Shawtown ES Addition, with the name of the Bidder and his North Carolina State Contractor's Registration Number.
- C. The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

A-2. BIDDING DOCUMENTS:

- A. Bidding Documents include the Information for Bidders, Form of Proposal and the proposed Contract Documents, including any Addenda issued prior to receipt of bids. All requirements and obligations of the Bidding Documents are hereby incorporated by reference into the Contract Documents and are binding on the Successful Bidder upon award of the contract.

A-3. BIDDER'S REPRESENTATIONS:

Each Bidder by submitting his Bid represents that:

- A. He has read and understands that Bidding Documents and his Bid is made in accordance therewith; and Bidder agrees to be bound by the terms and requirements set forth in the Bidding and Contract Documents;
- B. He has visited the site, has familiarized himself with the local conditions under which the Work is to be performed herein, and has correlated his observations with the requirements of the proposed Contract Documents;
- C. The Bidder acknowledges and represents that he has made allowances for normal inclement weather indigenous to the Project Site, in his estimating, planning and scheduling of the Work. The Bidder hereby certifies that the work shall be completed, in place, in full accordance with the Contract Documents, within the time limits specified.
- D. He has made a good faith effort to solicit Minority Business Enterprises (MBEs) per N.C. Gen. Stat. 143-131, as subcontractors.
- E. He has received the General and any Supplementary Conditions for the Project.

A-4. SITE CONDITIONS AND CONDITIONS OF THE WORK:

- A. Each bidder must acquaint himself thoroughly as to the character and nature of the work to be done. Each bidder furthermore must make a careful examination of the site of the work and inform himself fully as to the difficulties to be encountered in the performance of the work, the facilities for delivering, storing and placing materials and equipment, and other conditions relating to construction and labor.
- B. No plea of ignorance of conditions that exist or may hereafter exist on the site of the work, or difficulties that may be encountered in the execution of the work, as a result of failure to make necessary investigations and examinations, will be accepted as an excuse for any failure or omission on the part of the successful Bidder to fulfill in every detail all the requirements of the Contract Documents and to complete the work or the consideration set forth therein, or as a basis for any claim whatsoever.
- C. Insofar as possible, the Successful Bidder, in carrying out his work, must employ such methods or means as will not cause interruption of or interference with the work of the Owner or any separate contractor.

A-5. BIDDER'S QUESTIONS, ADDENDA AND INTERPRETATIONS:

- A. Bidders and Sub-bidders shall promptly notify the Design Consultant of any ambiguity, inconsistency or error which they may discover upon examination of the Bidding and Contract Documents or of the site and local conditions. No interpretation of the meaning of the drawings, specifications or other contract documents will be made to any Bidder orally.
- B. Every request for such interpretation should be in writing addressed to the Design Consultant with a copy forwarded to the Owner.
- C. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Bidding Documents which, if issued, will be transmitted to all prospective Bidders (at the respective addresses furnished for such purposes) not later than three calendar days prior to the date fixed for the opening of bids. Neither the Design Consultant nor the Owner will be responsible for any other explanations or interpretations of the proposed documents. Failure of any Bidder to receive any such addendum or interpretation shall not relieve any bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the Contract Documents.
- D. Each Bidder shall ascertain prior to submitting his bid that he has received all Addenda issued, and he shall acknowledge receipt and inclusion in his proposal of all Addenda.
- E. He has received the General and any Supplementary Conditions for the Project.

A-6. SECURITY FOR FAITHFUL PERFORMANCE:

- A. The Successful bidder shall furnish a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Sum as security for the faithful performance of this Contract and also a Labor and Material Payment Bond in an amount not less than one hundred percent (100%) of the Contract Sum, as security for the payment of all persons performing labor and furnishing materials under this Contract. The Performance Bond and the Labor and Material Payment Bond shall be delivered to the Owner not later than the date of execution of the Contract.

A-7. LIABILITY INSURANCE AND WORKMEN'S COMPENSATION:

The Successful Bidder will be required to carry public liability and workmen's compensation and other insurance in the amounts and under the terms stipulated under the General Conditions.

A-8. RIGHT TO REJECT BIDS:

The Owner expressly reserves the right to reject any or all bids, to waive any informalities or irregularities in the bids received, and to accept that bid which in its judgment, best serves the interest of the Owner.

A-9. EQUAL PRODUCTS AND SUBSTITUTIONS:

- A. Unless specifically stated to the contrary, any Bidder may, with Owner's written approval, use any article, device, product, material, fixture, form or type of construction which in the judgment of the Design Consultant is equal to that specified considering quality, workmanship, economy of operation, durability, suitably for the purpose intended, and acceptability for use on the project. Approval by the Owner prior to bid opening is mandatory and acceptance of substitutions will be in the form of an Addendum to the Specifications issued to all prospective Bidders indicating that the additional makes or brands are equivalent to those specified. Nothing in this paragraph is intended to restrict or inhibit free and open competition on school system projects. The bidder may request approval for substitutions after award of the contract in accordance with the contract General Conditions.

A-10. PREPARATION AND SUBMITTAL OF FORM OF BID:

- A. Bids shall be submitted utilizing the Form of Proposal as bound herein, or otherwise provided with the Contract Documents, and shall be complete in every respect. The total bid amount shall be entered in words and figures in the space provided. Where applicable, the unit price or lump sum items, and their extensions, shall be entered in figures in the respective columns provided for each bid item. All entries shall be typewritten or printed in ink. The signatures of all persons shall be in longhand. Any entry of amount that appears on the face of the bid to have involved an erasure, deletion, white-out and/or substitution or other such change or alteration, shall show by them the initials of the person signing the bid and the date of the change or alteration. A failure to comply with this requirement may be cause for disqualification of the bid.
- B. For Unit Price bids, in the event of any discrepancies between the unit prices and the extensions thereof or the total bid amount, the unit prices shall govern. For Lump Sum bids, in the event of a discrepancy between the bid amount in writing and that in figures, the written value shall govern.
- C. Bids shall not contain any restatement or qualifications of work to be done, and alternate bids will not be considered unless called for. No oral bids or modifications will be considered.
- D. All applicable Federal, State and Local taxes shall be included in the Bidder's proposal.

A-11. MODIFICATION OR WITHDRAWAL OF BID:

- A. A bidder may withdraw his bid from consideration if such bid was based upon a mistake.
- B. Prior to the time and date designated for receipt of bids, any 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.
- C. Withdrawn bids may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with this Information for Bidders.

A-12. DETAILED BID BREAKDOWN:

If the Owner directs, the Bidder shall provide a detailed breakdown of his bid acceptable to the Owner. In addition to verifying accounting requirements, the breakdown may be used by the Owner to determine whether the Bidder has grossly misjudged the requirements of any area. Failure to provide the requested detailed breakdown may result in rejection of the bid proposal.

A-13. AWARD OF CONTRACT:

The contract will be awarded to the lowest responsive and responsible bidder, taking into consideration quality, performance, and the time specified in the bids for the performance of the contract.

- A. The lowest bidders shall be determined by the aggregate amount of the unit prices set forth in the form of bid, if work is bid on a unit price basis, or the aggregate amount of the Base Bid, plus any Alternates selected by the Owner.
- B. A Responsible Bidder shall mean a Bidder who has the capability, in all respects, to perform fully the contract requirements and the moral and business integrity and reliability which will assure good faith performance. In determining responsibility, the following criteria will be considered:
 - 1. The ability, capacity and skill of the Bidder to perform the contract or provide the service required;
 - 2. Whether the bidder can perform the contract or provide the service promptly, or within the time specified, without delay or interference;
 - 3. The character, integrity, reputation, judgment, experience and efficiency of the Bidder;
 - 4. The quality of performance of previous contracts or services. For example the following information will be considered:
 - a. The administrative and consultant cost overruns incurred by Owners on previous contracts with Bidder,
 - b. The Bidder's compliance record with contract general conditions on other projects,

- c. The submittal by the bidder of excessive and/or unsubstantiated extra cost proposals and claims on other projects,
 - d. The Bidder's record for completion of the work within the Contract Time or within Contract Milestones and Bidders compliance with scheduling and coordination requirements on other projects,
 - e. The Bidder's demonstrated cooperation with the Owner or the Design Consultant and other contractors on previous contracts,
 - f. Whether the work performed and materials furnished on previous contracts was in accordance with the Contract Documents;
5. The previous and existing compliance by the bidder with laws and ordinances relating to contracts or services;
 6. The sufficiency of the financial resources and ability of the Bidder to perform the contract or provide the service;
 7. The quality, availability and adaptability of the goods or services to the particular use required;
 8. The ability of the Bidder to provide future maintenance and service for the warranty period of the contract;
 9. Whether the Bidder has been declared in default on a project;
 10. Whether the bidder has demonstrated a good faith effort to use MBEs as subcontractors;
 11. Such other information as may be secured by the Owner having a bearing on the decision to award the contract, to include, but not limited to:
 - a. The ability, experience and commitment of the Bidder to properly and reasonably plan, schedule, coordinate and execute the Work,
 - b. Whether the Bidder has ever been debarred from bidding or found ineligible for bidding on any other projects.
- D. The purpose of the above is to enable the Owner in its opinion, to select the lowest responsible bidder. The ability of the low Bidder to provide the required bonds will not of itself demonstrate responsibility of the Bidder.
- E. The Owner reserves the right to require from the Bidder within twenty-four (24) hours of bid opening: (1) submissions of references to include a listing of previous and current projects, including a listing of public school construction projects completed in North Carolina, (2) financial statements indicating current financial status, prepared in accordance with generally accepted accounting principles, by a CPA licensed to do business in North Carolina, and (3) any other information deemed necessary in order to establish the responsiveness and responsibility of the bidder.
- F. The Owner reserves the right to defer award of this contract for a period of ninety (90) days after the due date of bids. During this period time, the Bidder shall guarantee the prices quoted in his bid.

END OF SECTION

SECTION 00 31 00
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
1. Geotechnical Exploration Information.
 2. Fire Hydrant Flow Information.

1.2 GEOTECHNICAL EXPLORATION INFORMATION

- A. A copy of the referenced information is included in PART 3 of this Section.
1. Title: GEOTECHNICAL ENGINEERING REPORT
. Lillington-Shawtown Elementary Addition
. 855 Old US Hwy 421
. Lillington, North Carolina
 2. Prepared For: Harnett County Schools
. Mr. Steve Matthews
. 1008 S 11th Street
. Lillington, NC 27546
 3. Prepared By: Terracon
. Tom Schipporeit, PE, BC.GE, Senior Geotechnical Engineer
. Rachel Zelinsky, EI, Senior Staff Engineer
. 2401 Brentwood Road, Suite 107
. Raleigh, NC 27604
 4. Preparer's Project: No. 70245031
 5. Report Date: May 7, 2024
 6. Total Pages: 41 pages
- B. This information identifies properties of below grade conditions and offers recommendations for design of foundations, prepared primarily for use of the Architect and Engineer.
- C. Recommendations described are not requirements of this Contract, unless specifically referenced in Contract Documents.
- D. This information, by its nature, cannot reveal all conditions existing on the site. Each bidder is responsible for investigating the site and independently verifying subsurface information and conditions prior to bidding.
- E. All bidders are to assume the site is unclassified soil and price accordingly. The contract documents do not include provisions for unit cost or allowances for soil work.

1.3 FIRE HYDRANT FLOW INFORMATION

- A. A copy of the referenced information is included in PART 3 of this Section.
 - 1. Title: Hydrant Flow Test Report
 - 2. Subject: 63407 – LSES Gym Addition – Hydrant Flow Test Results
 - 3. To: Will Altman, P.E., Timmons Group
Steve Matthews, Harnett County Schools
 - 4. From: Christopher Petree, PE, Timmons Group
 - 5. Date: March 19, 2024
 - 6. Total Pages: 4 pages
- B. This information is not part of the requirements of this Contract, unless specifically referenced in Contract Documents.

PART 2 (Not Used)

PART 3 INFORMATION AND REPORTS

3.1 INFORMATION AND REPORTS

- A. The information and reports referenced in PART 1 of this Section are included after this page, unless indicated otherwise in PART 1.
- B. This Section ends after the last referenced and included informational document.

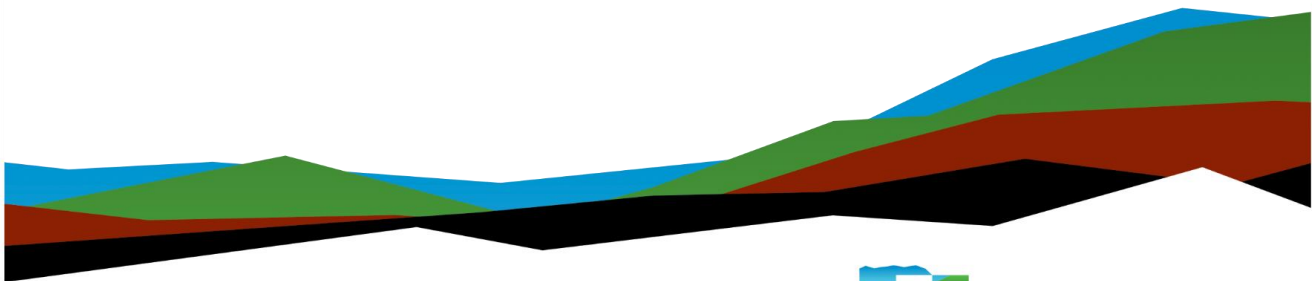
Lillington-Shawtown Elementary Addition

Geotechnical Engineering Report

May 7, 2024 | Terracon Project No. 70245031

Prepared for:

Harnett County
1008 South 11th Street
Raleigh, North Carolina 27601



Nationwide
[Terracon.com](https://www.terracon.com)

- Facilities
- Environmental
- Geotechnical
- Materials



2401 Brentwood Road, Suite 107
Raleigh, NC 27604
P (919) 873-2211
North Carolina Registered Firm: F-0869

Terracon.com

May 7, 2024

Harnett County
1008 South 11th Street
Raleigh, North Carolina 27601

Attn: Steve Matthews
P: 910-893-4808
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Re: Geotechnical Engineering Report
Lillington-Shawtown Elementary Addition
855 Old US Hwy 421
Lillington, North Carolina
Terracon Project No. 70245031

Dear Mr. Matthews:

We have completed the scope of Geotechnical Engineering services for the above-referenced project in general accordance with Terracon Proposal No. P70245031 dated February 8, 2024. This report presents the findings of the subsurface exploration and provides geotechnical recommendations for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon

Rachel Zelinsky, EI
Senior Staff Engineer

Tom Schipporeit, PE, BC.GE
Senior Geotechnical Engineer

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- Exploration and Testing Procedures
- Site Location and Exploration Plans
- Exploration and Laboratory Results
- Supporting Information

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Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the  logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

Refer to each individual Attachment for a listing of contents.

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Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed building addition to be located at 855 Old US Hwy 421 in Lillington, North Carolina. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Site Location and Exploration Plans
- SPT Boring logs with field and laboratory data
- Stratification based on visual soil classification
- Groundwater levels observed during and after the completion of drilling
- Subsurface exploration procedures
- Seismic site class per 2018 North Carolina Building Code
- Earthwork recommendations including site/subgrade preparation
- Recommended foundation option and engineering design parameters
- Estimated settlement of foundations
- Recommendations for design and construction of floor slabs

The geotechnical engineering Scope of Services for this project included the advancement of SPT borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and SPT boring locations are shown on the [Site Location](#) and [Exploration Plan](#), respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the SPT boring logs and as separate graphs and tables in the [Exploration Results](#) section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

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Item	Description
Information Provided	This report is based on the following sources of information: <ul style="list-style-type: none"> ■ Emails between Tom Hughes with SFLA and Taylor Dowell with Terracon between February 1, 2024, and February 6, 2024 ■ Request for Proposal provided by SFLA on February 6, 2024 ■ Site Plan, Sheet C3.0, prepared by Timmons Group, dated March 17, 2024 ■ Civil and architectural drawings for the existing elementary school prepared by Shuller Ferris Lindstrom & Associates dated February 5, 2002
Project Description	The project includes a 1-story gymnasium building, a fire lane, and sidewalks.
Building Construction	Not provided; we anticipate that addition will be constructed using steel or masonry and slab-on-grade construction techniques.
Finished Floor Elevation	Not provided; we have assumed that finished will be between elevations 318 and 319 feet, generally matching the existing building's finish floor elevation.
Maximum Loads	Anticipated structural loads were not provided. In the absence of information provided by the design team, we used the following loads in estimating settlement based on our experience with similar projects. <ul style="list-style-type: none"> ■ Columns: 250 kips ■ Walls: 6 kips per linear foot (klf) ■ Slabs: 150 pounds per square foot (psf)
Grading	We assume that 1 to 3 feet of fill will be required to achieve design grades in the gymnasium building area.
Building Code	2018 North Carolina

Terracon should be notified if any of the above information is inconsistent with the planned construction, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available topographic maps.

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Item	Description
Parcel Information	The project is located at 855 Old US Hwy 421 in Lillington, North Carolina. Project site is approximately 43 acres. See Site Location
Existing Improvements	Existing school facility with paved fire lane, playground, and basketball courts. The finish floor elevation of the existing school building near the proposed gymnasium is 318.54 feet. Existing underground utilities include stormwater pipe and inlet structures, in addition to a fire protection water line. Based on the 2002 Grading Plan, the proposed project area was excavated about 5 to 9 feet below the original ground surface to achieve the existing grades at the site.
Current Ground Cover	Earthen, lightly vegetated
Existing Topography	The site is relatively flat with elevations between 316 and 318 feet.

Geotechnical Characterization

Geology

The project site is located in the Coastal Plain Physiographic Province. The Coastal Plain soils consist mainly of marine sediments that were deposited during successive periods of fluctuating sea level and moving shoreline. The soils include sands, silts, and clays with irregular deposits of shells, which are typical of those lain down in a shallow sloping sea bottom. Recent alluvial sands, silts, and clays are typically present near rivers and creeks.

The site is underlain by Middendorf Formation. This formation consists of sand, sandstone, and mudstone.

Soil and Rock Conditions

We have developed a general characterization of the subsurface conditions based upon our review of the recent Terracon subsurface explorations, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the [Exploration Results](#) and the GeoModel can be found in the [Figures](#) attachment of this report.

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As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Sand	Medium dense to dense Silty Sand (SM) and Clayey Sand (SC)
2	Silt	Soft to very stiff Silt (ML) and Elastic Silt (MH)

Groundwater Conditions

The borings were advanced in the dry using a hollow stem auger drilling technique that allows short term groundwater observations to be made while drilling and at the completion of drilling. Groundwater seepage was not encountered within the maximum drilling depth at the time of our field exploration in Borings B-1, B-2, and B-5. Groundwater was measured at depths of 12.5 to 12.7 feet in Borings B-3 and B-4. Mapping by the Natural Resources Conservation Service (NRCS) indicates a seasonal high groundwater level approximately 4 feet below the ground surface.

Groundwater conditions may be different at the time of construction. Groundwater conditions may change because of seasonal variations in rainfall, runoff, and other conditions not apparent at the time of drilling. Long-term groundwater monitoring was outside the scope of services for this project.

Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration test (SPT) resistance (N-values), or undrained shear strength in accordance with the 2018 North Carolina Building Code. Based on the soil properties observed at the site and as described on the exploration logs and results, our professional opinion is that a **Seismic Site Classification of D** be considered for the project based on measured shear wave velocity values.

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Geotechnical Overview

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the SPT borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

Based on the conditions encountered and estimated load-settlement relationships, the proposed structure can be supported on **shallow foundations** consisting of conventional continuous or spread footings.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report limitations.

Earthwork

Earthwork is anticipated to include stripping, excavations, and structural fill placement. The following sections provide recommendations for use in the preparation of specifications for earthwork. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations and floor slabs.

Utility Abandonment

Special precautions should be made to remove abandoned underground utilities, if encountered, and their associated backfill as the structure's foundations may overlay these materials. Terracon considers removing the existing utilities and/or underground structures and backfilling the resulting trenches to be the preferred method of abandonment. In-place abandonment by filling piping with grout should only be considered in the building footprint after checking the location of the piping in both plan and elevation space for potential conflict with the proposed foundations, construction, and new utilities. Care should be given to locating and addressing these items during the site preparation phase of the project. If overlooked, they could be detrimental to the long-term performance of the structure.

Site Preparation

Prior to placing fill, existing vegetation, topsoil, and rootmat should be removed. Complete stripping of the topsoil and rootmat should be performed in the proposed building, fire lane, and sidewalk areas.

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Although no evidence of fill or underground facilities (such as septic tanks, cesspools, and basements) was observed during the exploration and site reconnaissance, such features could be encountered during construction. If unexpected fills or underground facilities are encountered, such features should be removed, and the excavations thoroughly cleaned prior to backfill placement and/or construction.

Subgrade Preparation

Proofrolling should be performed after stripping and prior to placing fill in fill areas and after stripping and excavating to design subgrade elevations in cut areas. The subgrade should be proofrolled with an adequately loaded vehicle (20 tons minimum) such as a tandem-axle or tri-axle dump truck. The proofrolling should be performed under the observation of the Geotechnical Engineer or representative. Areas excessively deflecting or considered unstable under the proofroll should be delineated and subsequently addressed by the Geotechnical Engineer. Methods of subgrade improvement could include scarification, moisture conditioning and recompaction; removal of unstable materials and replacement with select granular fill (with or without geosynthetics); and chemical stabilization.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable; however, the workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Excavation Considerations

Excavation Safety

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local and/or state regulations.

Excavations or other activities resulting in ground disturbance have the potential to affect structures and utilities. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/ precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities should be monitored or instrumented for potential ground movements that could negatively affect nearby structures and utilities.

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Excavation should not be conducted below a downward 1:1 projection from existing foundations without engineering review of shoring requirements and geotechnical observation during construction.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Dewatering

We anticipate that temporary construction excavations more than 4 feet deep could encounter groundwater, especially during seasonal high water table conditions. The contractor should design, furnish, install, test, operate, monitor, and maintain a dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades. This will require lowering the groundwater to at least 2 feet below the bottoms of the construction excavations in sands. The contractor should accomplish dewatering without damaging any existing buildings, structures, and site improvements adjacent to and near the excavations.

Typical temporary dewatering measures used on similar projects in the project area consist of sump excavations, sump pumps, well points, wells, and/or sheetpile cutoff walls.

The responsibility for dewatering of construction excavations and preventing excessive settlement of existing structures and other site features due to dewatering should lie solely with the contractor. This information is provided only as a service and under no circumstance should Terracon be assumed to be responsible for the effectiveness of the construction dewatering method(s) selected by the contractor.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below or within 10 feet of structures and pavements. General fill is material used to achieve grade outside of these areas.

Reuse of On-Site Soil: Excavated on-site soil may be selectively reused as fill. Please note, however, that moisture-conditioning of on-site soils may be required to achieve adequate compaction.

Material property requirements for on-site soil for use as general fill and structural fill are noted in the table below:

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Property	General Fill	Structural Fill
Composition	Free of deleterious material	Free of deleterious material
Maximum particle size	6 inches (or 2/3 of the lift thickness)	3 inches
Fines content	Not limited	Not limited
Plasticity	Not limited	Maximum liquid limit of 50 Maximum plasticity index of 30

1. Based on subsurface exploration. Actual material suitability should be determined in the field at time of construction.

Imported Fill Materials: Imported fill materials should meet the following material property requirements. Regardless of its source, structural fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade.

Soil Type ¹	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity, Fine-Grained Soil	CL, CL-ML ML	Liquid Limit less than 50 Plasticity index less than 30
Coarse-Grained Soil	GW, GP, GM, GC, SW, SP, SM, SC	Less than 50% passing No. 200 sieve Liquid Limit less than 50 Plasticity index less than 30
Select Granular Fill ²	SP, SP-SM, SW, or SW-SM	Less than 12% passing No. 200 sieve Plasticity index less than 10

1. Structural and general fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site. Additional geotechnical consultation should be provided prior to use of uniformly graded gravel (GP) on the site.
2. NCDOT Class II, Type 1 Select Material. Manufactured materials such as processed fill (i.e., screenings) meeting this specification can be used.

Fill Placement and Compaction Requirements

Structural and general fill should meet the following compaction requirements.

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Item	Structural Fill	General Fill
Maximum Lift Thickness	10 inches in loose thickness when heavy, self-propelled compaction equipment is used 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used	Same as structural fill
Minimum Compaction Requirements^{1,2}	95% of the material's standard Proctor maximum dry density (ASTM D698). 98% of the material's standard Proctor maximum dry density (ASTM D698) in upper 1 foot of structural fill.	92% of the material's standard Proctor maximum dry density (ASTM D698).
Water Content Range¹	Low plasticity fine-grained soil (PI<30): -3% to +3% of optimum Coarse-grained soil: -3% to +3% of optimum	As required to achieve min. compaction requirements and stability

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).
2. Materials not amenable to density testing should be placed and compacted to a stable condition observed by the Geotechnical Engineer or representative.

Pipe Bedding and Utility Trench Backfill

Pipe bedding and trench backfill should be in accordance with the applicable public works standard details and specifications for the type of pipe to be supported. (For example, the NCDOT has published standard pipe bedding and backfilling details for flexible and rigid pipe for normal earth foundation, rock foundation, and unsuitable material foundation conditions.) Backfill materials, placement, and testing should be in accordance with the public works requirements or the other earthwork recommendations given in this report, whichever are more stringent. If open-graded materials, such as No. 78 or No. 57 stone, are used, they should be completely wrapped in a woven geotextile that can be used for both separation and filtration (e.g., Mirafi HP270).

Grading and Drainage

All grades must provide effective drainage away from the structures during and after construction and should be maintained throughout the life of the structure.

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Water retained next to the structures can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements resulting in cracked slabs and walls.

Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Construction Observation and Testing

Terracon should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proofrolling, placement and compaction of engineered fill, backfilling of excavations, and just prior to construction of building floor slabs.

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, and pavements), evaluation and remediation of existing fill materials, as well as proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of structural fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of structural fill in the building areas and 5,000 square feet in fire land and sidewalk areas. Where not specified by local ordinance, one density and water content test should be performed for every 100 linear feet of compacted utility trench backfill and a minimum of one test performed for every 12 vertical inches of compacted backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. A representative of the geotechnical engineer should use a combination of hand auger borings and dynamic cone penetrometer (DCP) testing to determine the suitability of the bearing materials for the design bearing pressure. DCP testing should be performed to a depth of 3 to 5 feet below the bottom of foundation excavation. If existing fill is found below the proposed foundation the hand auger and DCP should be extended to natural soils. In areas where existing fill remains under the proposed building the frequency of testing should be increased. If unanticipated conditions are observed, the Geotechnical Engineer should recommend mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

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Shallow Foundations

The proposed building addition can be supported by shallow foundations. If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive and Lateral Loads

Item	Description
Maximum Net Allowable Bearing Pressure ^{1, 2}	3,000 psf
Required Bearing Stratum ³	Undisturbed low-plasticity (PI<30) native soils or structural fill.
Minimum Foundation Dimensions ⁴	Columns: 2 ft width and 2 ft length Walls: 2 ft width
Ultimate Passive Resistance (Equivalent fluid pressure) ⁵	480 pcf
Sliding Resistance ⁶	0.35 ultimate coefficient of friction
Minimum Embedment below Finished Grade ⁷	Columns: 2 feet Walls: 2 feet
Estimated Total Settlement from Structural Loads ²	Less than about 1 inch under sustained gravity loads
Estimated Differential Settlement ^{2, 8}	Less than about 1/2 inch under sustained gravity loads

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. The allowable bearing pressure can be increased by 1/3 for use with the alternative load combinations given in Section 1605.3.2 of the 2018 North Carolina Building Code. Please note, however, that additional foundation settlement will occur under these load combinations. The project structural engineer should select the appropriate footing width to maintain a bearing pressure not exceeding those recommended in this table, and to maintain an appropriate clear distance between footings to prevent overlap of soil stress distributions. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum unfactored service loads noted in **Project Description**. Additional geotechnical consultation will be necessary if higher loads are anticipated.
3. Unsuitable, unstable, very soft to soft soil, and/or very loose to loose soil should be overexcavated and replaced per the recommendations presented in **Earthwork**.

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Item	Description
4.	Minimum footing dimensions required to achieve recommended allowable bearing pressure with a factor of safety of at least 2.5.
5.	Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. Assumes no hydrostatic pressure. Horizontal movement of the foundation must occur to mobilize full passive resistance values. Apply a factor of safety of at least 2.0 to this value when designing for lateral force resistance.
6.	Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Frictional resistance is dependent on the bearing pressure which may vary due to load combinations. Horizontal movement of the foundation must occur to mobilize the frictional resistance.
7.	Embedment necessary to minimize the effects of frost (12-inch design frost depth for this site) and to achieve recommended allowable bearing pressure with a factor of safety of at least 2.5. Finished grade is the lowest adjacent grade for perimeter footings and final building pad grade for interior footings. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
8.	Differential settlements are noted for equivalent-loaded foundations and bearing elevation as measured over a span of 50 feet.

Design Parameters – Overturning and Uplift Loads

Shallow foundations subjected to overturning loads should be proportioned such that the resultant eccentricity is maintained in the center-third of the foundation (e.g., $e < b/6$, where b is the foundation width). This requirement is intended to keep the entire foundation area in compression during the extreme lateral/overturning load event. Foundation oversizing may be required to satisfy this condition.

Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils with consideration to the IBC basic load combinations.

Item	Description
Soil Moist Unit Weight	130 pcf
Soil Effective Unit Weight¹	68 pcf
Soil weight included in uplift resistance	Soil included within the prism extending up from the top perimeter of the footing at an angle of 20 degrees from vertical to ground surface

1. Effective (or buoyant) unit weight should be used for soil above the foundation level and below a water level. The high groundwater level should be used in uplift design as applicable.

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Construction Adjacent to Existing Building

Differential settlement between the gymnasium addition and the existing building is expected to approach the magnitude of the total settlement of the addition. Expansion joints should be provided between the existing building and the proposed addition to accommodate differential movements between the two structures. Underground piping between the two structures should be designed with flexible couplings and utility knockouts in foundation walls should be oversized so minor deflections in alignment do not result in breakage or distress. Care should be taken during excavation adjacent to existing foundations to avoid disturbing existing foundation bearing soils.

New footings should bear at or near the bearing elevation of immediately adjacent existing foundations. Depending upon their locations and current loads on the existing footings, footings for the new addition could cause settlement of adjacent walls. To reduce this concern and risk, clear distances at least equal to the new footing widths should be maintained between the addition's footings and footings supporting the existing building.

We understand existing foundations may support additional load from the proposed hallway of the gymnasium addition. Based on our understanding of the **Project Description**, the additional loads could be up to about 6 klf for walls and 250 kips for columns. Additional loads on the existing foundations could cause other building settlements to occur. The structural capacity of existing foundations should be evaluated by a licensed structural engineer, where increases in loading are planned.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the observation of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

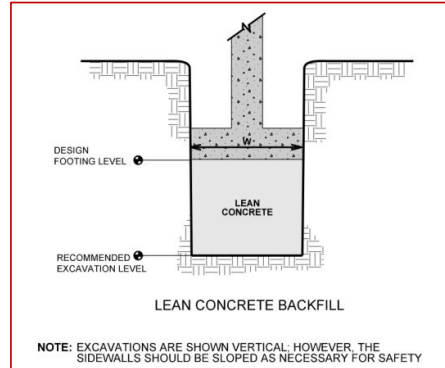
Loose or soft soils exposed at the surface of footing excavations may require surficial compaction with hand-held dynamic compaction equipment prior to placing structural fill, reinforcing steel, and/or concrete. Should surficial compaction not be adequate, construction of a working surface consisting of either well-graded crushed stone (ABC) or a lean concrete mud mat may be required prior to the placement of reinforcing steel and construction of foundations.

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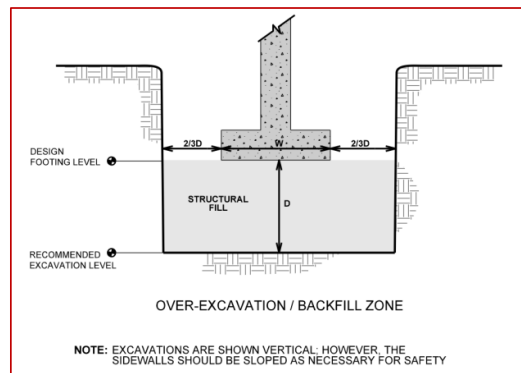
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If unsuitable bearing soils are observed at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. The lean concrete replacement zone is illustrated on the sketch below.



Overexcavation for structural fill placement below footings should be conducted as shown below. The overexcavation should be backfilled up to the footing base elevation with structural fill placed as recommended in the **Earthwork** section. If poorly-graded gravel (e.g., GP, No. 57 stone, or No. 67 stone) is used, it should be wrapped in a woven geotextile that can be used for both separation and filtration (e.g., Mirafi HP270).



Floor Slabs

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the base course beneath the floor slab(s).

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Floor Slab Design Parameters

Item	Description
Floor Slab Support¹	Use 4 inches of base course. For slabs above exterior grades ² , the base course material should consist of compactible, easy-to-trim, granular fill that will remain stable and support construction traffic. Suitable materials include soil which classifies as SP, SW, or SM. ABC ³ , No. 57 stone, or No. 67 stone can also be used.
Estimated Modulus of Subgrade Reaction⁴	150 pounds per square inch per inch (psi/in) for point loads

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation (unless a post-tensioned monolithic slab is used).
2. A base course is not required by 2018 NC Building Code nor ACI 302 for floor slabs above exterior grade. However, it is good design and construction practice to include a base course to provide uniform support and improve constructability, especially over fine-grained subgrade soils.
3. Per ACI 360R-12, ABC produces more uniform support and provides an all-weather working surface to speed construction during inclement weather.
4. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.

The use of a vapor retarder or vapor barrier should be considered beneath concrete slabs-on-grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, when the project includes humidity-controlled areas, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder or barrier, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder or barrier.

Saw-cut contraction joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations, refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

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Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

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Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

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Figures

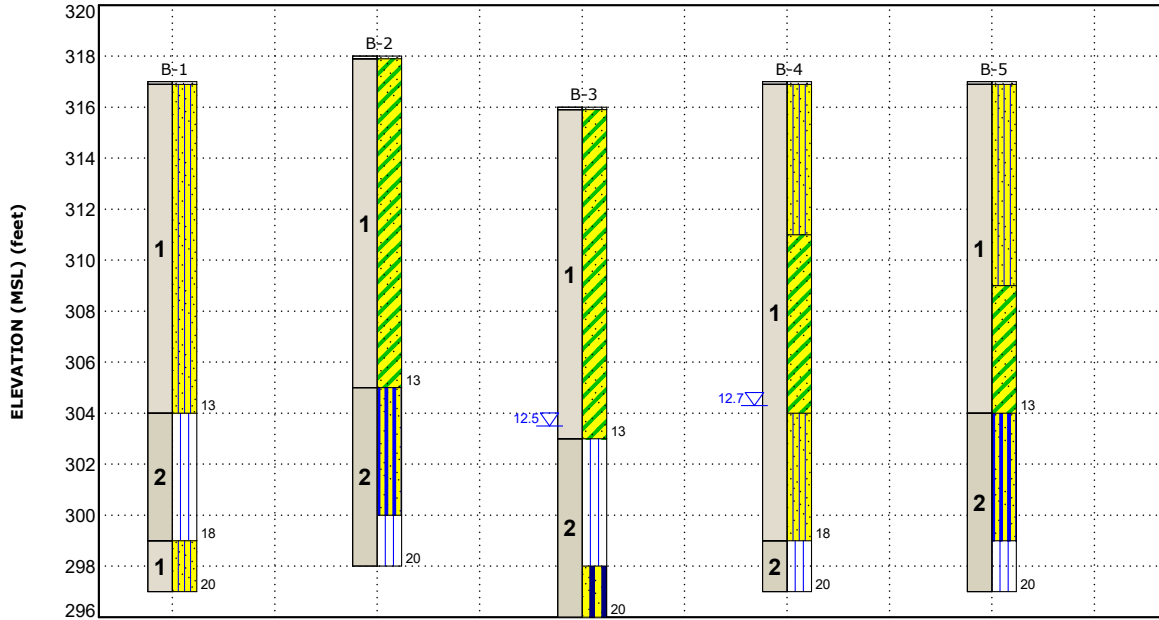
Contents:

GeoModel

Lillington-Shawtown Elementary Addition
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GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description	Legend	
1	Sand	Medium dense to dense Silty Sand (SM) and Clayey Sand (SC)	Topsoil	Silty Sand
2	Silt	Soft to very stiff Silt (ML) and Elastic Silt (MH)	Silt	Clayey Sand
			Sandy Silt	Sandy Elastic Silt

First Water Observation

NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

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Attachments

Geotechnical Engineering Report
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Exploration and Testing Procedures

Field Exploration

Number of Borings	Approximate Boring Depth (feet)	Location
5	20	Gymnasium addition

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±10 feet) and referencing existing site features. Approximate ground surface elevations were estimated using the 2002 Grading Plan.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted rotary drill rig using continuous flight augers (solid stem and/or hollow stem, as necessary, depending on soil conditions). Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. For safety purposes, all borings were backfilled with auger cuttings after their completion.

We also observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. The groundwater levels are shown on the attached boring logs.

The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by geotechnical staff. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent our interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

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Geophysical Testing: Additionally, Terracon conducted a geophysical exploration utilizing a seismic refraction system. Geophysical testing was performed along two arrays at the approximate locations shown on the Exploration Plan. Both Refraction microtremors (ReMi) and MASW seismic data sets were collected. The data were then reduced to determine shear velocities of the subsurface strata to a depth of 100 feet.

Laboratory Testing

Geotechnical staff reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Atterberg Limits
- Percent Fines

The laboratory testing program included examination of soil samples by geotechnical staff. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

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Site Location and Exploration Plans

Contents:

Site Location Plan
Exploration Plan

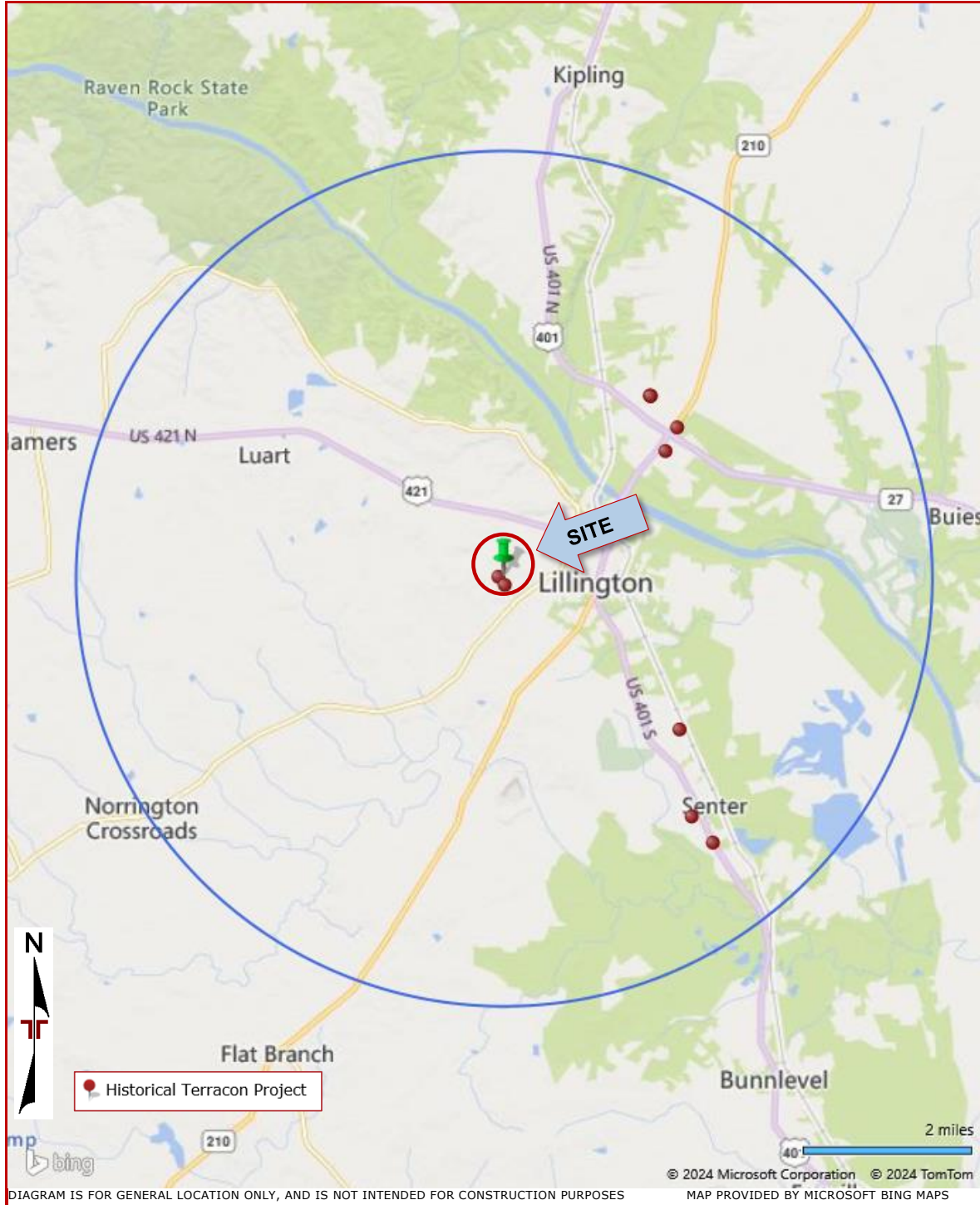
Note: All attachments are one page unless noted above.

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Site Location

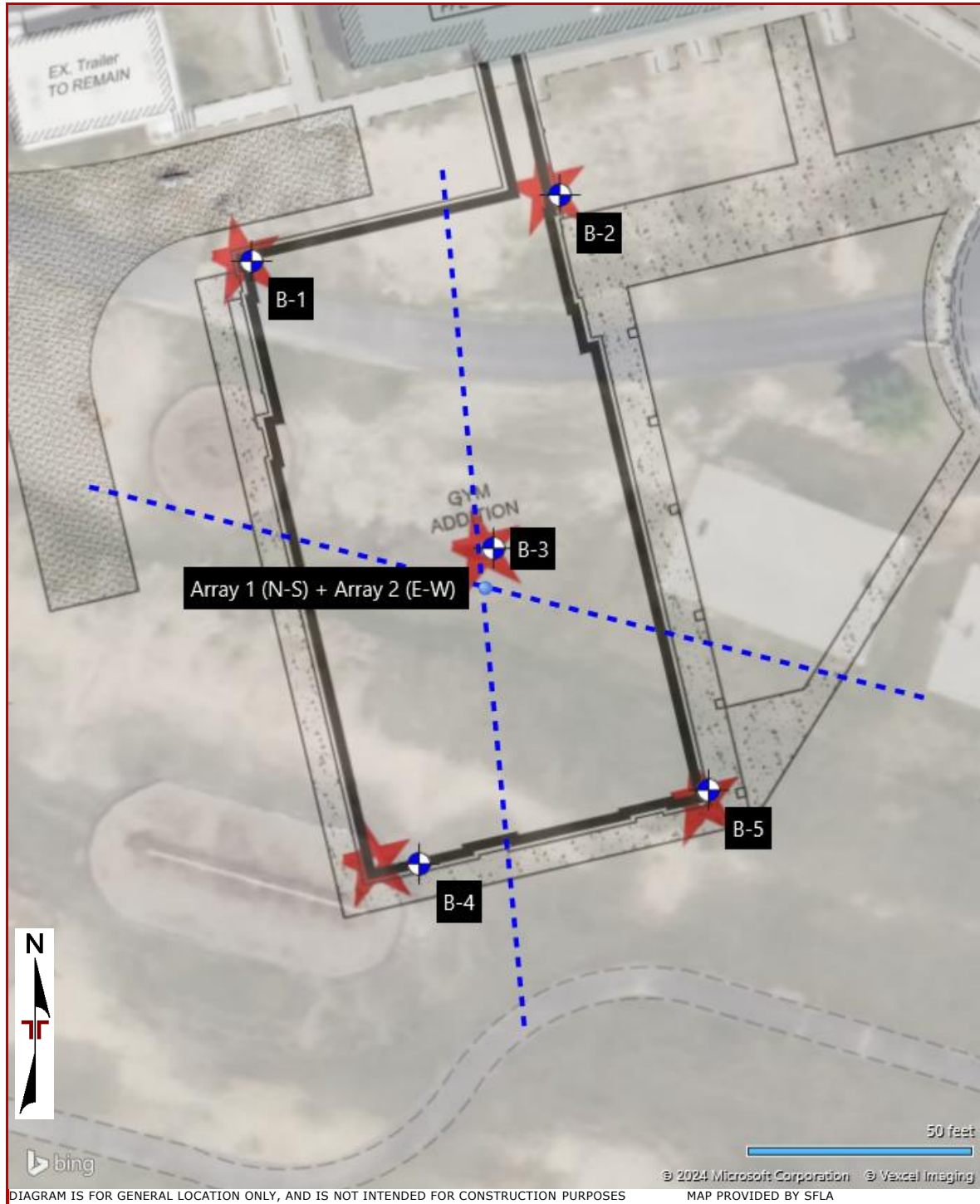


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Exploration Plan



Exploration and Laboratory Results

Contents:

Boring Logs
Atterberg Limits
Seismic Site Class Results

Note: All attachments are one page unless noted above.

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Boring Log No. B-1

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 35.3927° Longitude: -78.8379°	Depth (Ft.)	Elevation: 317 (Ft.) +/-	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits	
									LL-PL-PI	Percent Fines
		Depth (Ft.)		Elevation: 317 (Ft.) +/-						
		0.1		316.9						
		TOPSOIL (1 inch)								
		SILTY SAND (SM) , red, brown, and white, medium dense to dense								
1			5				6-9-11 N=20			
							7-15-19 N=34			
							21-24-25 N=49			
			10				9-10-10 N=20			
		13.0		304						
2		SILT (ML) , purplish light gray, very stiff								
			15				4-7-9 N=16			
		18.0		299						
1		SILTY SAND (SM) , brown and light gray, medium dense								
							4-6-9 N=15			
		20.0		297						
		Boring Terminated at 20 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).
 See Supporting Information for explanation of symbols and abbreviations.
 Elevation Reference: Elevations were interpolated from a topographic site plan.

Water Level Observations
 Borehole dry to cave-in depth

Cave-in depth

Drill Rig
 CME 550

Hammer Type
 Automatic

Driller
 J&L Drilling

Notes

Advancement Method
 2.25" Hollow Stem Auger

Abandonment Method
 Boring backfilled with auger cuttings upon completion.

Logged by
 Rachel Zelinsky

Boring Started
 04-16-2024

Boring Completed
 04-16-2024

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Boring Log No. B-2

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 35.3927° Longitude: -78.8377°	Depth (Ft.)	Elevation: 318 (Ft.) +/-	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits	
									LL-PL-PI	Percent Fines
			0.1	317.9						
		TOPSOIL (1 inch)								
		CLAYEY SAND (SC) , light gray, pink, and orangish tan, very dense to dense					10-15-25 N=40	14.6	56-21-35	40
1							25-25-26 N=51			
							14-21-23 N=44			
							10-16-19 N=35			
			13.0	305			6-2-2 N=4			
2		SANDY SILT (ML) , light gray and orangish brown, soft to medium stiff								
			18.0	300			6-8-11 N=19			
		SILT (ML) , purplish light gray, very stiff								
			20.0	298						
		Boring Terminated at 20 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).
 See Supporting Information for explanation of symbols and abbreviations.
 Elevation Reference: Elevations were interpolated from a topographic site plan.

Water Level Observations
 Borehole dry to cave-in depth

Cave-in depth

Drill Rig
 CME 550

Hammer Type
 Automatic

Driller
 J&L Drilling

Notes

Advancement Method
 2.25" Hollow Stem Auger

Logged by
 Rachel Zelinsky

Abandonment Method
 Boring backfilled with auger cuttings upon completion.

Boring Started
 04-16-2024

Boring Completed
 04-16-2024

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Boring Log No. B-3

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 35.3925° Longitude: -78.8377°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits	
								LL-PL-PI	Percent Fines
		Depth (Ft.) Elevation: 316 (Ft.) +/- 315.9							
1		0.1' TOPSOIL (1 inch) CLAYEY SAND (SC) , orange, red, tan, medium dense				5-8-10 N=18	15.3	49-21-28	29
			5			4-6-7 N=13			
						6-12-6 N=18			
			10			4-6-8 N=14			
2		13.0' SILT (ML) , purplish light gray, very stiff				8-10-15 N=25			
			15						
						2-3-3 N=6			
			20						
		18.0' SANDY ELASTIC SILT (MH) , purple and light gray, medium stiff							
		20.0' Boring Terminated at 20 Feet							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).
 See Supporting Information for explanation of symbols and abbreviations.
 Elevation Reference: Elevations were interpolated from a topographic site plan.

Water Level Observations
 At completion of drilling
 Cave-in depth

Drill Rig
 CME 550
Hammer Type
 Automatic
Driller
 J&L Drilling

Notes

Advancement Method
 2.25" Hollow Stem Auger

Logged by
 Rachel Zelinsky
Boring Started
 04-16-2024
Boring Completed
 04-16-2024

Abandonment Method
 Boring backfilled with auger cuttings upon completion.

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Boring Log No. B-4

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 35.3923° Longitude: -78.8378°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits	
								LL-PL-PI	Percent Fines
		Depth (Ft.) Elevation: 317 (Ft.) +/-							
		0.1' TOPSOIL (1 inch)	316.9						
		SILTY SAND (SM) , tan, white, and pink, medium dense				10-10-15 N=25			
						7-8-8 N=16			
		6.0' CLAYEY SAND (SC) , orange and brown, medium dense	311			5-6-6 N=12			
						6-6-7 N=13			
1		13.0' SILTY SAND (SM) , orangish tan and light gray, medium dense	304			7-7-6 N=13			
						8-10-12 N=22			
2		18.0' SILT (ML) , purplish light gray, very stiff	299						
		20.0' Boring Terminated at 20 Feet	297						

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).
 See Supporting Information for explanation of symbols and abbreviations.
 Elevation Reference: Elevations were interpolated from a topographic site plan.

Water Level Observations
 At completion of drilling
 Cave-in depth

Drill Rig
 CME 550
Hammer Type
 Automatic
Driller
 J&L Drilling

Notes

Advancement Method
 2.25" Hollow Stem Auger

Logged by
 Rachel Zelinsky
Boring Started
 04-16-2024
Boring Completed
 04-16-2024

Abandonment Method
 Boring backfilled with auger cuttings upon completion.

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Boring Log No. B-5

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 35.3924° Longitude: -78.8375°	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits	
								LL-PL-PI	Percent Fines
		Depth (Ft.) Elevation: 317 (Ft.) +/-							
		0.1' TOPSOIL (1 inch)	316.9						
		SILTY SAND (SM) , tan, pink, and white, medium dense							
1						5-7-4 N=11			
			5			7-12-12 N=24			
						9-10-10 N=20			
		8.0'	309						
		CLAYEY SAND (SC) , orange and tan, medium dense				4-5-6 N=11			
		13.0'	304						
		SANDY SILT (ML) , purple, light gray, and brown, stiff				5-6-7 N=13			
2									
		18.0'	299						
		SILT (ML) , purple and light gray, very stiff				7-10-10 N=20			
		20.0'	297						
		Boring Terminated at 20 Feet							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (if any).
 See Supporting Information for explanation of symbols and abbreviations.
 Elevation Reference: Elevations were interpolated from a topographic site plan.

Water Level Observations
 Borehole dry to cave-in depth

Drill Rig
 CME 550

Hammer Type
 Automatic

Driller
 J&L Drilling

Cave-in depth

Advancement Method
 2.25" Hollow Stem Auger

Logged by
 Rachel Zelinsky

Abandonment Method
 Boring backfilled with auger cuttings upon completion.

Boring Started
 04-16-2024

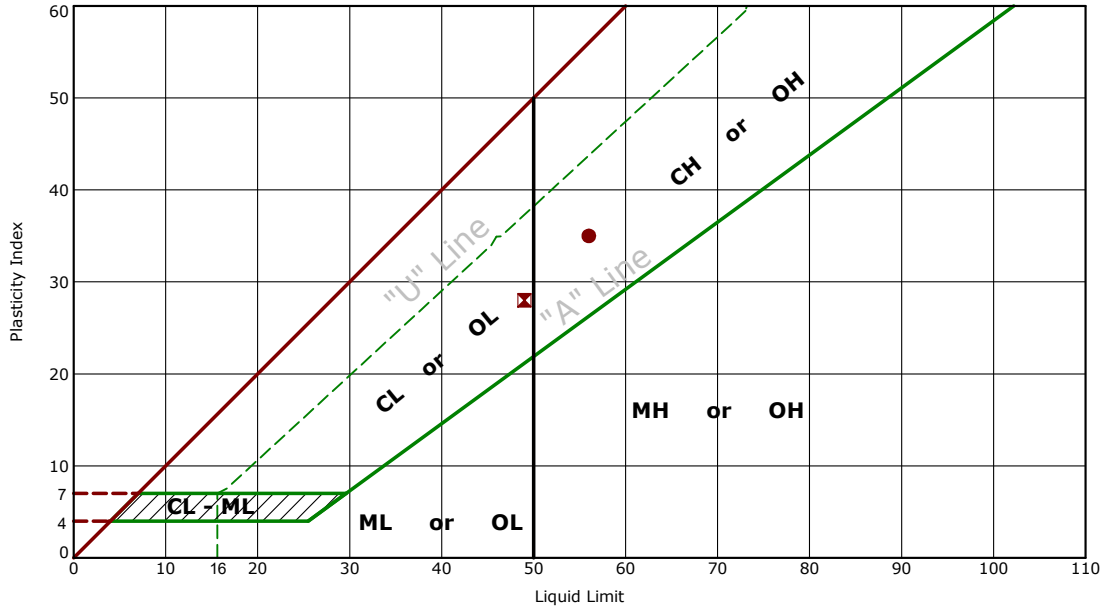
Boring Completed
 04-16-2024

Notes

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Atterberg Limit Results ASTM D4318

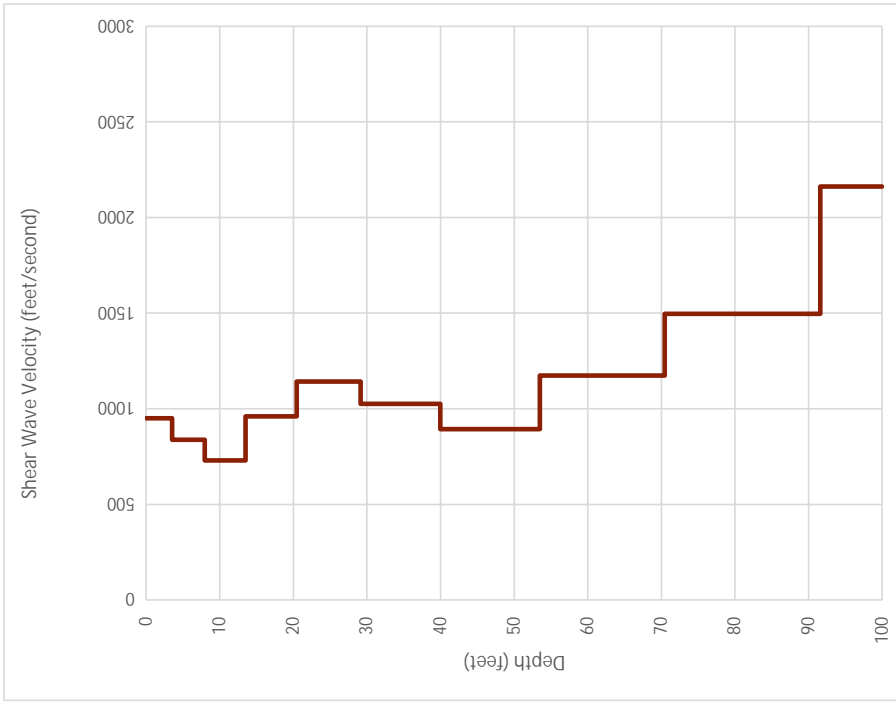


	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	B-2	1 - 2.5	56	21	35	40.3	SC	CLAYEY SAND
■	B-3	1 - 2.5	49	21	28	29.1	SC	CLAYEY SAND



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Exploration Results - Seismic Site Class

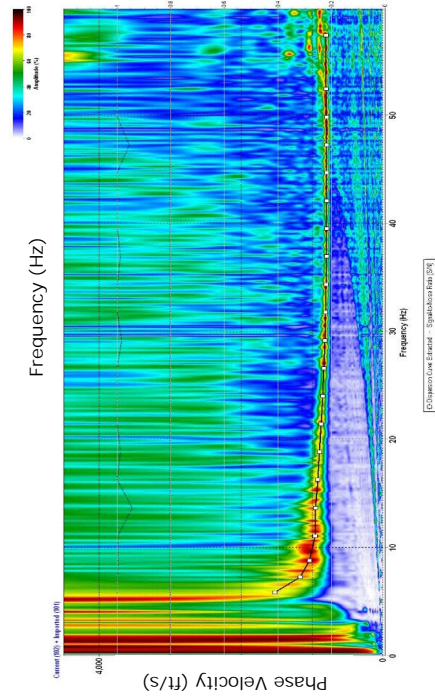
Array 1



Average Weighted Shear Wave Velocity (ft/s)^{1,2} = 1,116
 Seismic Site Classification^{1,2} = D

- 1. per 2018 International Building Code
- 2. measured between 0 ft and 100 ft, based on shear wave velocity

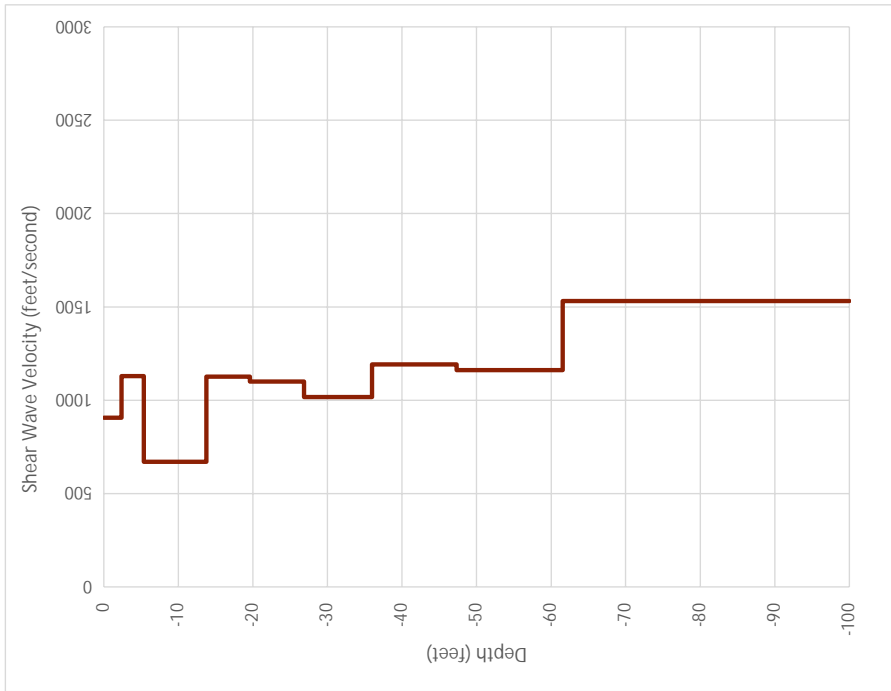
Testing Results	
Depth (ft)	S-wave velocity (ft/s)
0.0	950.6
-3.6	950.6
-8.0	837.8
-13.5	730.2
-20.5	960.9
-29.1	1,142.9
-40.0	1,025.7
-53.5	892.9
-70.4	1,174.3
-91.6	1,495.8
-100.0	2,162.2



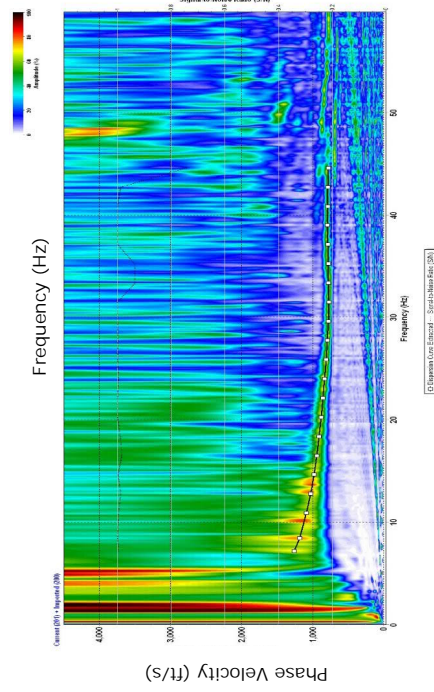


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Exploration Results - Seismic Site Class

Array 2



Depth (ft)	S-wave velocity (ft/s)
0.0	906.0
-2.4	906.0
-5.4	1,128.6
-9.1	670.3
-13.8	669.6
-19.6	1,126.3
-26.9	1,100.1
-36.0	1,017.7
-47.3	1,191.3
-61.6	1,161.5
-100.0	1,531.7



Average Weighted Shear Wave Velocity (ft/s)^{1,2} = 1,171
 Seismic Site Classification^{1,2} = D
 1. per 2018 International Building Code
 2. measured between 0 ft and 100 ft., based on shear wave velocity

Supporting Information






Contents:

- General Notes
- Unified Soil Classification System

Lillington-Shawtown Elementary Addition
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General Notes

Sampling	Water Level	Field Tests
 Split Spoon	<ul style="list-style-type: none">  Water Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time  Cave In Encountered <p>Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.</p>	<ul style="list-style-type: none"> (N) Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer (UC) Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		Consistency of Fine-Grained Soils (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Relative Density	Standard Penetration or N-Value (Blows/Ft.)	Consistency	Unconfined Compressive Strength Qu (tsf)	Standard Penetration or N-Value (Blows/Ft.)
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

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Unified Soil Classification System

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: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3$ ^E	GW	Well-graded gravel ^F	
		Gravels with Fines: More than 12% fines ^C	$Cu < 4$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ ^E	GP	Poorly graded gravel ^F	
			Fines classify as ML or MH	GM	Silty gravel ^{F, G, H}	
		Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	Fines classify as CL or CH	GC	Clayey gravel ^{F, G, H}
	$Cu \geq 6$ and $1 \leq Cc \leq 3$ ^E			SW	Well-graded sand ^I	
	Sands with Fines: More than 12% fines ^D		$Cu < 6$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ ^E	SP	Poorly graded sand ^I	
			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: Organic:	$PI > 7$ and plots above "A" line ^J	CL	Lean clay ^{K, L, M}
$PI < 4$ or plots below "A" line ^J				ML	Silt ^{K, L, M}	
Inorganic: Organic:			$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$	OL	Organic clay ^{K, L, M, N} Organic silt ^{K, L, M, O}	
			PI plots on or above "A" line	CH	Fat clay ^{K, L, M}	
Silts and Clays: Liquid limit 50 or more		Inorganic: Organic:	PI plots below "A" line	MH	Elastic silt ^{K, L, M}	
			$\frac{LL \text{ oven dried}}{LL \text{ not dried}} < 0.75$	OH	Organic clay ^{K, L, M, P} Organic silt ^{K, L, M, Q}	
		Highly organic soils:	Primarily organic matter, dark in color, and organic odor		PT	Peat

^A Based on the material passing the 3-inch (75-mm) 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 Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

^E $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

^F If soil contains $\geq 15\%$ 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 $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded 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 $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

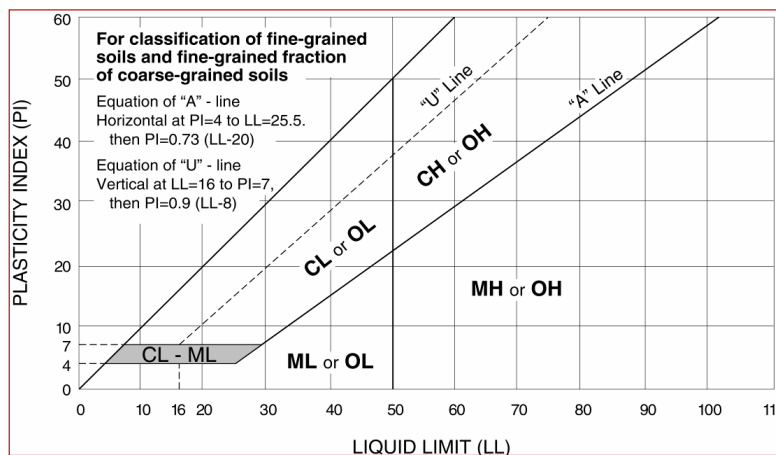
^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^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.





Hydrant Flow Test Report

To: Will Altman, P.E. Timmons Group
Steve Matthews, Harnett County Schools
Katherine E. Moore, Harnett County Water
From: Christopher Petree, P.E. Timmons Group
Subject: 63407 – LSES Gym Addition – Hydrant Flow Test Results
Date: March 19, 2024

Test Location: To the west of Lillington Shawtown Elementary.
Attendees: Luke Solari, Timmons Group
Juliana Hopper, Timmons Group
Griffin Rhodes, Timmons Group
Veronica Dalton, Timmons Group
Jamie Johnson, Harnett County Schools
Timothy Holder, Harnett County Schools
James Lowery, Harnett County Water
Tony Allen, Harnett County Water

Instantaneous Flow Test

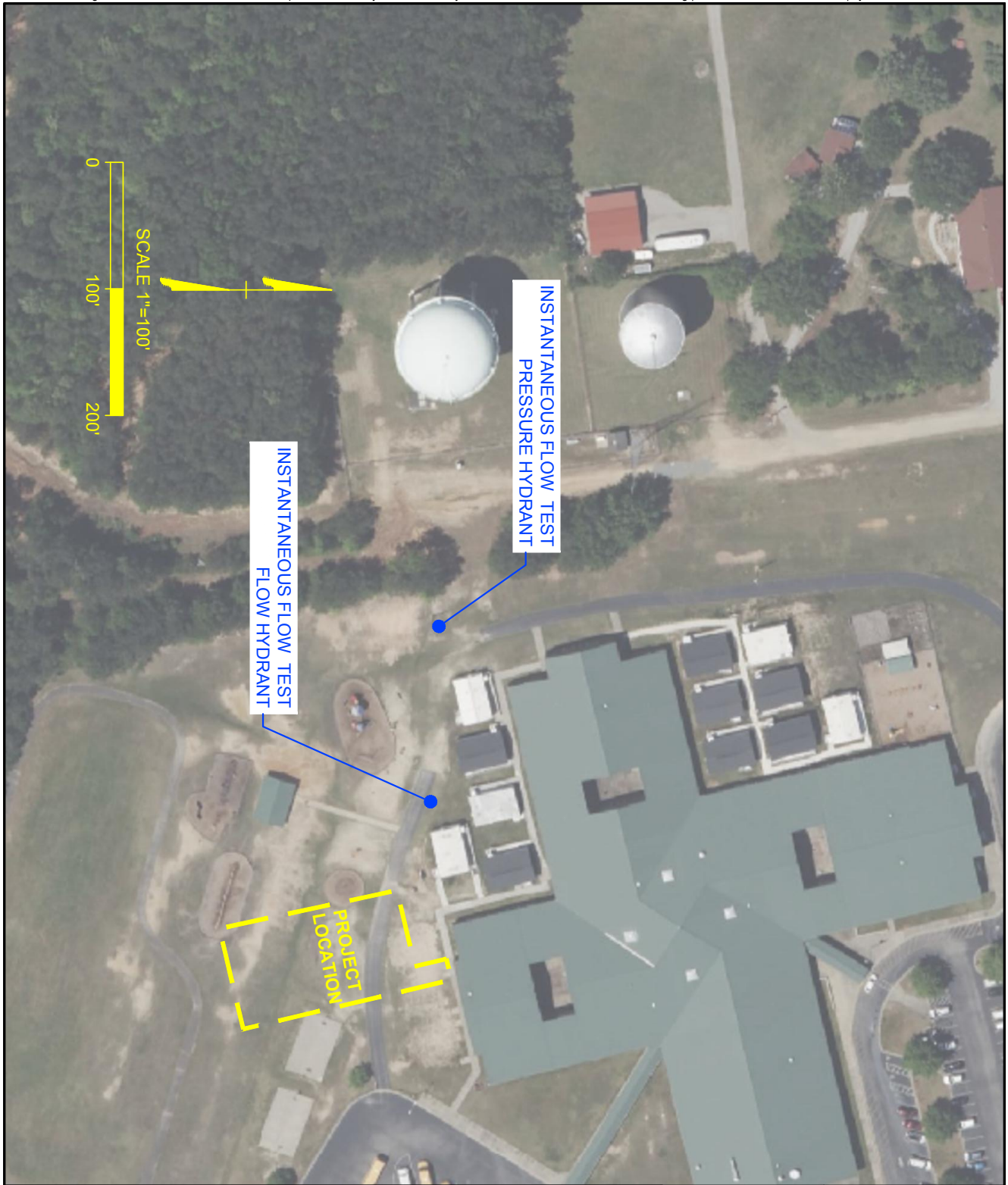
Date and Time of Test: March 12, 2024 at approximately 2:15 pm.
Flow Hydrant Location (No Number): To the south of Lillington Shawtown Elementary, next to the mobile classrooms.
Approximate Elevation: 330 FT
Flow Rate During Test: 865 Gallons Per Minute (GPM)

Pressure Hydrant Location (No Number): To the west of Lillington Shawtown Elementary.
Approximate Elevation: 330 FT
Static Pressure (No Flow): 37 PSI
Residual Pressure During Test: 36 PSI

Calculated Available Flow at 20 PSI: 3,994 GPM

ATTACHED:
Flow Test Map
Available Flow Curve
Photographs

K:\200\212 - Raleigh Utilities\Water Models for Other Groups\Harnett County\63407-LSES Gym Addition\DWG\63407-FLOWTESTMAP.dwg | Plotted on 3/18/2024 9:10 AM | by Luke Solari



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

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RALEIGH OFFICE
 5410 Trinity Road, Suite 102 | Raleigh, NC 27607
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TBM NO.
63407
 SHEET NO.
2

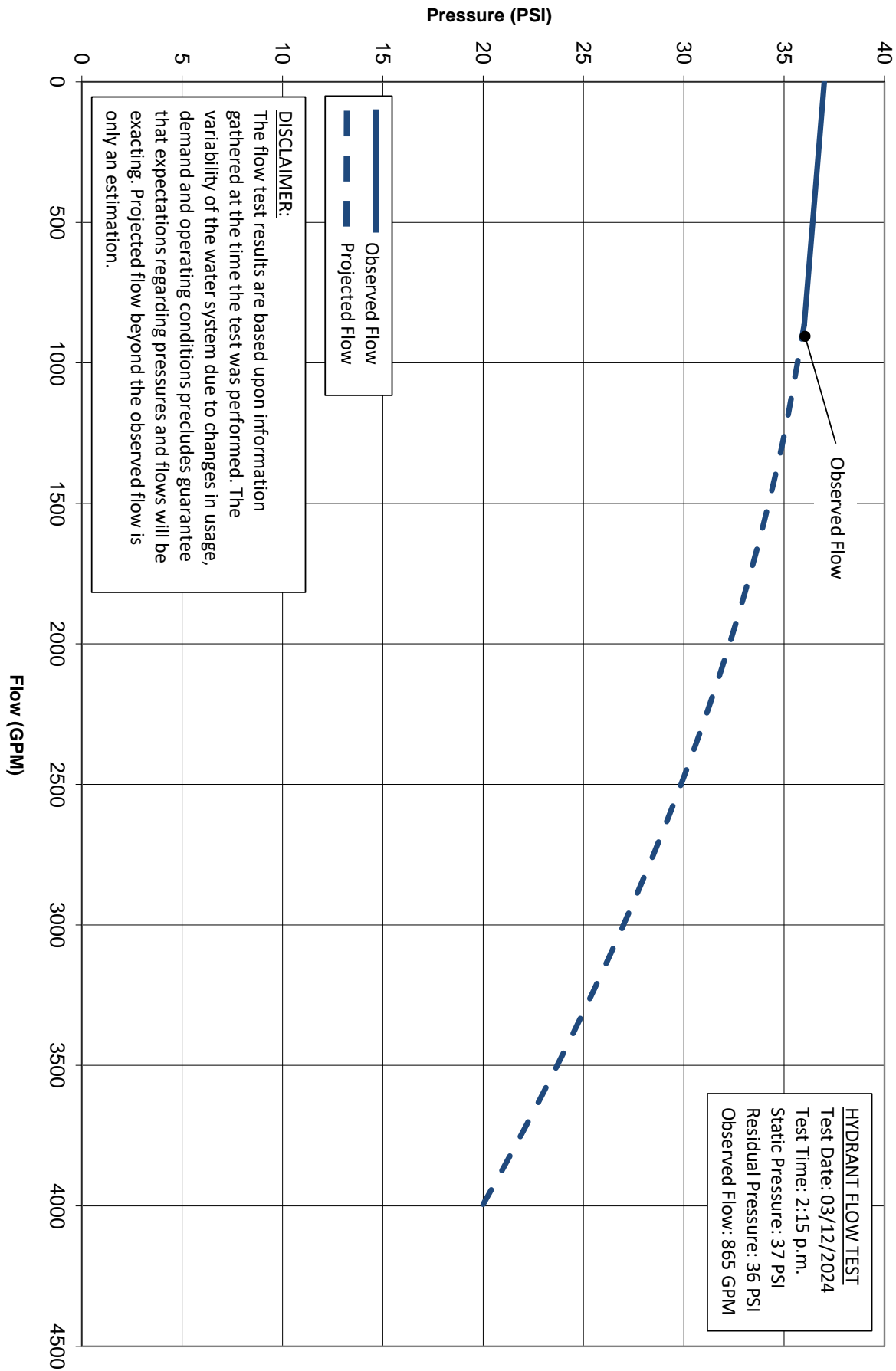
LSES GYM ADDITION
 LILLINGTON - HARNETT COUNTY - NORTH CAROLINA
FLOW TEST MAP

DRAWN BY
 L. SOLARI
 DESIGNED BY
 L. SOLARI
 CHECKED BY
 C. PERRE
 SCALE
 1" = 100'

DATE	REVISION DESCRIPTION

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Instantaneous Flow Test Curve - Fire Hydrant Located to the West of Lillington Shawtown Elementary





Photograph 1. Fire Hydrant (Flow Hydrant) located to the south of Lillington Shawtown Elementary, next to the mobile classrooms.



Photograph 2. Fire Hydrant (Pressure Hydrant) located to the west of Lillington Shawtown Elementary.

**SECTION 00 41 00
BID FORM
STIPULATED SUM**

Lillington Shawtown Elementary School Gymnasium
Harnett County, North Carolina

Date _____

The undersigned, as Bidder, hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud.

The bidder further declares that he has examined the site of the work and informed himself fully in regard to all conditions pertaining to the places where the work is to be done; that he has examined the Contract Documents relative thereto and he has taken special note that work shall be guaranteed for a period of one year after acceptance by Owner; and he has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed.

The bidder proposes and agrees if this proposal is accepted to contract with the Owner in the form of contract specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the work as stated below in full and in complete accordance with the Contract Documents, as prepared by SfL+a Architects, with a definite understanding that no money will be allowed for extra work except as set forth in the Contract Documents for the sum of:

BASE BID

_____ Dollars (\$ _____)

Plumbing Subcontractor _____ License No.: _____

Mechanical Subcontractor _____ License No.: _____

Electrical Subcontractor _____ License No.: _____

The bidder further proposes and agrees to commence work on a date to be specified in a written Notice to Proceed, estimated to be on or about November 22nd, 2024, and shall be substantially complete with the Work by November 21st, 2025. The bidder also agrees to a Final Completion within 30 days from the date of the Certificate of Substantial Completion..

ALLOWANCES

The Base Bid for general construction Work is to include Allowances. The requirements for Allowances are as follows, and as further detailed in Section 01 21 00 - Allowances and the Contract Documents.

Unit Cost Allowances (UCA)

UCA-1: Unit Masonry - BRK1\$450.00 per thousand

Stipulated Sum Allowances (SSA)

SSA-1: Security System\$200,000.00

Quantity Allowances (QA)

**QA-1: Woven Geo-Textile Separation
and Stabilization Fabric In-Place500 Square Yards**

QA-2: Removal of Unsuitable Soil (Bulk).....750 Cubic Yards

QA-3: Removal of Unsuitable Soil (Trench).....250 Cubic Yards

**QA-4: Replacement of Removed Unsuitable Soils
or Rock with Off-Site Suitable Soils In-Place.....1,000 Cubic Yards**

**QA-5: Replacement of Removed Unsuitable Soils
or Rock with Off-Site Aggregate Base Course In-Place.....500 Cubic Yards**

Contingency Allowances (CA)

CA-1: General Contingency Allowance:.....\$150,000.00

ALTERNATES

Should any Alternates be accepted, the amounts written below shall be the amount to be added to or deducted from the Base Bid. The requirements for Alternates are as follows, and as further detailed in Section 01 23 00 - Alternates and the Contract Documents.

Alternate No. 1 – Special-Lite Composite Door Assemblies (Owner Preferred):

State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 2 - Door Hardware:

Alternate No. 2A – Schlage Locks and Latches (Owner Preferred):

State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 2B – Von Duprin Exit Devices (Owner Preferred):

State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 2C – LCN Door Closers (Owner Preferred):

State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 2D – Ives Continuous Hinges (Owner Preferred):

State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 2E – Best cylinders and cores, Grand Master Key System (Owner Preferred):
State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 3 - Plumbing Fixtures:

Alternate No. 3A – Sloan Faucets (Owner Preferred):
State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 3B – Sloan Flush Valves (Owner Preferred):
State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 3C – Elkay Water Coolers (Owner Preferred):
State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 4 – Apollo Plumbing Piping Valves (Owner Preferred):
State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 5 – Trane HVAC Equipment (Owner Preferred):
State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 6 – Lithonia Lighting Fixtures (Owner Preferred):
State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 7 – Square D Electrical Switchgear (Owner Preferred):
State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

Alternate No. 8 – EST Fire Alarm Equipment (Owner Preferred):
State the amount to be added to the Base Bid.

Add _____ Dollars (\$ _____)

UNIT PRICES

Unit Prices quoted and accepted shall apply throughout the life of the contract, except as specifically noted. Unit Prices shall be applied, as appropriate, to compute the total value of changes in the scope of the Work in accordance with the Contract Documents. The requirements for Unit Prices are as follows, and as further detailed in Section 01 22 00 - Unit Prices and the Contract Documents.

Unit Price No. 1: Exit Sign\$ _____ Each

Unit Price No. 2: Surface Mounted Speaker/Strobe.....\$ _____ Each

Unit Price No. 3: Smoke Detector.....\$ _____ Each

Unit Price No. 4: Heat Detector\$ _____ Each

Unit Price No. 5: Fire Alarm Pull Station.....\$ _____ Each

Unit Price No. 6: Sidewalk\$ _____ Per SY

Unit Price No. 7: Site Bollard.....\$ _____ Each

**Unit Price No. 8: Woven Geo-Textile
Separation and Stabilization Fabric In-Place\$ _____ Per SY**

Unit Price No. 9: Removal of Unsuitable Soil (Bulk).....\$ _____ Per CY

Unit Price No. 10: Removal of Unsuitable Soil (Trench).....\$ _____ Per CY

Unit Price No. 11: Removal of Rock (Bulk).....\$ _____ Per CY

Unit Price No. 12: Removal of Rock (Trench).....\$ _____ Per CY

**Unit Price No. 13: Replacement of Removed Unsuitable
Soil or Rock with Off-Site Suitable Soil In-Place.....\$ _____ Per CY**

**Unit Price No. 14: Replacement of Removed Unsuitable
Soil or Rock with Off-Site Aggregate Base Course In-Place\$ _____ Per CY**

Provide on the Bid - Under GS 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of Minority Business Participation form) the minority businesses that it will use on the Project with the total dollar value of the bids that will be performed by the minority businesses. **Also**, on **Affidavit (A)**, list the good faith efforts made to solicit minority participation in the bid effort.

NOTE: A Contractor that performs all the work with its own workforce may submit an **Affidavit (B)** to that effect in lieu of the **Affidavit (A)** required above. The MB Participation Form must still be submitted even if there is zero participation.

After the Bid Opening - The Owner will consider all Bids and Alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An **Affidavit (C)** that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total Contract Price, which is equal to or more than the 10% goal established. This Affidavit shall give rise to the presumption that the bidder has made the required good faith effort and **Affidavit (D)** is not necessary;

OR

If less than the 10% goal, **Affidavit (D)** of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract.

NOTE: Bidders must always submit **with their bid** the Identification of Minority Business Participation listing all MB contractors, vendors and suppliers that will be used. If there is no MB participation, then enter zero on the form. **Affidavit (A) or Affidavit (B)**, as applicable, also must be submitted with the Bid. Failure to file a required Affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the Bid.

PROPOSAL SIGNATURE PAGE

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the Owner's account set aside for the project as liquidated damages for such failure; otherwise, the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Attach certified check, cash, or bid bond to this Proposal.

Respectfully submitted this _____ day of _____ 20 _____

(Name of Firm or Corporation Making Bid)

WITNESS: _____ By: _____

(Proprietorship or Partnership) Title: _____
(Owner, Partner, President or Vice President only)

Address: _____

License No.: _____

ATTEST:

By: _____

Title: _____
(Corporate Secretary or Assistant Secretary only)

(CORPORATE SEAL)

END OF BID FORM

SECTION 00 43 39.10
IDENTIFICATION OF MINORITY BUSINESS PARTICIPATION
(Attach to Bid)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES THE FOLLOW DOCUMENT

- A. IDENTIFICATION OF MINORITY BUSINESS PARTICIPATION (Attach to Bid).
 - 1. The document begins after this page and consists of 1 page.
 - 2. This Section ends at the end of the referenced document.

Identification of Minority Business Participation

I, _____,
(Name of Bidder)

do hereby certify that on this project, we will use the following minority business enterprises as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work type	*Minority Category

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**),
 Female (**F**) Socially and Economically Disadvantaged (**D**)

The total value of minority business contracting will be (\$)_____.

SECTION 00 43 39.20
AFFIDAVIT A - LISTING OF GOOD FAITH EFFORTS
(Attach to Bid)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES THE FOLLOW DOCUMENT

- A. AFFIDAVIT A - LISTING OF GOOD FAITH EFFORTS (Attach to Bid).
 - 1. The document begins after this page and consists of 1 page.
 - 2. This Section ends at the end of the referenced document.

Harnett County Schools-AFFIDAVIT A – Listing of Good Faith Efforts

County of Harnett

(Name of Bidder)

Affidavit of _____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- 1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- 2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- 3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- 4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- 5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- 6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- 7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- 8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- 9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- 10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

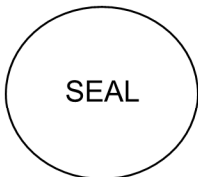
The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

SECTION 00 43 39.30

AFFIDAVIT B - INTENT TO PERFORM CONTRACT WITH OWN WORKFORCE

(Attach to Bid)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES THE FOLLOW DOCUMENT

- A. IDENTIFICATION OF MINORITY BUSINESS PARTICIPATION.
 - 1. The document begins after this page and consists of 1 page.
 - 2. This Section ends at the end of the referenced document.

Harnett County Schools-AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of Harnett

Affidavit of _____

(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____ contract.

(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

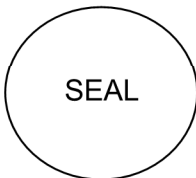
The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20__

Notary Public _____

My commission expires _____

SECTION 00 43 39.40

AFFIDAVIT C - PORTION OF THE WORK TO BE PERFORMED BY MINORITY FIRMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES THE FOLLOW DOCUMENT

- A. AFFIDAVIT C - PORTION OF THE WORK TO BE PERFORMED BY MINORITY FIRMS.
 - 1. The document begins after this page and consists of 1 page.
 - 2. This Section ends at the end of the referenced document.

Harnett County Schools - AFFIDAVIT C - Portion of the Work to be Performed by Minority Firms

County of Harnett

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by minority businesses as defined in GS143-128.2(g) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the _____
(Name of Bidder)

_____ (Project Name)
 Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*Minority Category	Work description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

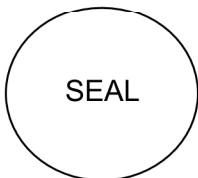
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

SECTION 00 43 39.50
AFFIDAVIT D - GOOD FAITH EFFORTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES THE FOLLOW DOCUMENT

- A. AFFIDAVIT D - GOOD FAITH EFFORTS.
 - 1. The document begins after this page and consists of 2 pages.
 - 2. This Section ends at the end of the referenced document.

Harnett County Schools AFFIDAVIT D – Good Faith Efforts

County of Harnett

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the _____
(Name of Bidder)

Project ID# _____ Amount of Bid \$ _____
(Project Name)

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	Work description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- B. Copies of quotes or responses received from each firm responding to the solicitation.
- C. A telephone log of follow-up calls to each firm sent a solicitation.
- D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
 - E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- F. Copy of pre-bid roster.
- G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- H. Letter detailing reasons for rejection of minority business due to lack of qualification.
- I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

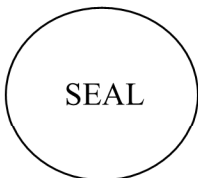
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

SECTION 00 52 00

OWNER-CONTRACTOR AGREEMENT

PROJECT NUMBER: ()

SCHOOL NAME: ()

THIS AGREEMENT, in four (4) copies, made this () day of _____, Two Thousand and Twenty by and between _____ (herein referred to as the "Owner"), whose mailing address is _____ and _____ (herein referred to as the "Contractor"), whose mailing address is _____. Correspondence, submittals, and notices relating to or required under this Contract shall be sent in writing to the above addresses; unless either party is notified in writing by the other, of a change in address.

WITNESSETH:

WHEREAS, it is the intent of the Owner to obtain the services of the Contractor in connection with the new construction of () (hereinafter referred to as the "Project" or the "Work"); and

WHEREAS, the Contractor desires to perform such construction in accordance with the terms and conditions of this Agreement,

NOW, THEREFORE, in consideration of the promises made herein and other good and valuable consideration, the following terms and conditions are hereby mutually agreed to, by and between the Owner and Contractor:

Article 1

DEFINITIONS

- 1.1 All terms in this Agreement which are defined in the Information for Bidders and the General Conditions shall have the meanings designated therein.
- 1.2 The Contract Documents are as defined in the General Conditions. Such documents form the Contract, and all are as fully a part thereof as if attached to this Agreement or repeated herein. The Contract Documents consist of the Owner-Contractor Agreement, the General and Supplemental Conditions of the Contract, the Drawings, the Specifications, all Addenda issued prior to bidding, and all Modifications and Change Orders issued after execution of the Contract.

Article 2

STATEMENT OF THE WORK

2.1 The Project is the Work identified in the plans and specifications prepared by _____ dated _____, 2020 for _____ Board of Education, _____, including the following addenda:

[Redacted]

A listing of the plans and specifications included in the Contract Documents is attached as Exhibit A.

2.2 The Parties agree that the Project shall include the following alternates:

[Redacted]

2.3 The Parties agree to the following modifications to the Project’s plans and specifications, including the noted value engineering items:

List item(s) and proposed deduct/add(s). If none, delete this language list “None”

2.4 The Parties agree that the following allowances are included in the Contract Sum in Section 5.1 below:

List item(s) and proposed allowance(s). If none, delete this language list “None”

2.5 The Contractor shall provide and pay for all materials, tools, equipment, labor and professional and non-professional services, and shall perform all other acts and supply all other things necessary, to fully and properly perform and complete the Work, as required by the Contract Documents.

2.6 The Contractor shall further provide and pay for all related facilities described in any of the Contract Documents, including all work expressly specified therein and such additional work as may be reasonably inferred therefrom, saving and excepting only such items of work as are specifically stated in the Contract Documents not to be the obligation of the Contractor. The totality of the obligations imposed upon the contractor by this Article and by all other provisions of the Contract Documents, as well as the structures to be built and the labor to be performed, is herein referred to as the "Work".

Article 3

DESIGN CONSULTANT

3.1 The Design Consultant (as defined in the General Conditions) shall be ([Redacted]) whose address is ([Redacted]), however, that the Owner may, without liability to the Contractor, unilaterally amend this Article from time to time by designating a different person or organization to act as its Design Consultant and so advising the Contractor in writing, at which time the person or organization so designated shall be the Design Consultant for purposes of this Contract.

Article 4

TIME OF COMMENCEMENT AND COMPLETION

- 4.1 The Contractor shall commence the Work promptly upon the date established in the Notice to Proceed. If there is no Notice to Proceed, the date of commencement of the Work shall be the date of this Agreement or such other date as may be established herein.
- 4.2 Time is of the essence. The Contractor shall achieve Final Completion, as defined in the General Conditions on or before the date established for Final Completion in the Supplemental Conditions.
- 4.3 The Supplemental Conditions contains certain specific dates that shall be adhered to and are the last acceptable dates unless modified in writing by mutual agreement between the Contractor and the Owner. All dates indicate midnight unless otherwise stipulated. The only exceptions to this schedule are defined in the General Conditions under 8.3 DELAYS AND EXTENSIONS OF TIME.
- 4.4 Should the Contractor fail to complete the Work on or before the dates stipulated for Substantial Completion and/or Final Completion, or such later date as may result from an extension of time granted by the Owner, he shall pay the Owner, as liquidated damages the sums set forth in the General and Supplemental Conditions.

Article 5

CONTRACT SUM

- 5.1 Provided that the Contractor shall strictly and completely perform all of its obligations under the Contract Documents, and subject only to additions and deductions by Modification or as otherwise provided in the Contract Documents, the Owner shall pay to the Contractor, in current funds and at the time and in the installments hereinafter specified, the sum of [redacted] Dollars (\$ [redacted]) herein referred to as the "Contract Sum". This amount includes the base bid and the Alternates in Section 2.2
- 5.2 The Contract Sum includes the value engineering items and other contract modifications noted in Section 2.3 above that total \$ _____.
- 5.3 Unit Prices are established as follows for the Project:

Unit Price No. 1		\$
Unit Price No. 2		\$
Unit Price No. 3		\$
Unit Price No. 4		\$
Unit Price No. 5		\$
Unit Price No. 6		\$
Unit Price No. 7		\$
Unit Price No. 8		\$

Article 6

PROGRESS PAYMENTS

6.1 The Contractor hereby agrees that on or about the First day of the month for every month during the performance of the Work he will deliver to the Owner's Project Manager an Application for Payment in accordance with the provisions of Article 9 of the General Conditions. This date may be changed upon mutual agreement, stated in writing, between the Owner and Contractor. Payment under this Contract shall be made as provided in the General Conditions. Payments due and unpaid under the Contract Documents shall not bear interest.

Article 7

OTHER REQUIREMENTS

7.1 The Contractor shall submit the Performance Bond, Labor and Material Payment Bond and Certification of Insurance as required by the Contract Documents.

7.2 The Owner shall furnish to the Contractor one (1) set of drawings and one (1) set of specifications, at no extra cost, for use in the Construction of the Work. Additional sets of drawings or specifications may be obtained by the Contractor by paying the Owner for the costs of reproduction, handling and mailing.

7.3 The Contractor shall make a good faith effort to utilize Historically Underutilized Businesses (HUB's) per N.C. Gen. Stat. 143-128.2, and as described in the construction documents.

7.4 The General Conditions, Supplemental Conditions and the plans and specifications, including any addenda, are incorporated herein by reference.

IN WITNESS WHEREOF, _____ Board of Education (hereinbefore called the "Owner") has caused these presents to be signed and its corporate seal to be hereunto affixed, attested by its Chairperson and Secretary, and _____ (hereinbefore called "Contractor") has caused these presents to be signed by its President and its Corporate seal to be hereunto affixed, as hereinafter attested, all as of the day and year first above written.

_____ **BOARD OF EDUCATION**

Board Chairperson

ATTEST:

**SECTION 00 61 13.13
PERFORMANCE BOND FORM**

IT IS HEREBY AGREED that

(Insert full name and address of Contractor)

as Principal, hereinafter called Contractor, and,

(Insert full name and address of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto the

as Obligee, hereinafter called Owner, in the amount of _____ Dollars (\$ _____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these obligations.

WHEREAS, Contractor has by written agreement dated _____, 20____, entered into a contract with Owner for the construction of _____ (Insert the name of the Project)

in accordance with Drawings and Specifications prepared by _____ (Insert full name and address of Architect/Engineer)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect. The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default, under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

- 1) Complete the Contract in accordance with its terms and conditions, or
- 2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make

available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of any applicable statute of limitations under the Contract.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this ____ day of _____ 20 ____.

PRINCIPAL

[Affix corporate seal]

(Name)_____

(Title)_____

(Witness)

SURETY

[Affix corporate seal]

(Name)_____

(Title)_____

(Witness)

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END OF SECTION

SECTION 00 61 13.16

LABOR AND MATERIAL PAYMENT BOND FORM

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

IT IS HEREBY AGREED that (Insert full name and address of Contractor)

as Principal, hereinafter called "Principal," and, (Insert full name and address of Surety)

as Surety, hereinafter called "Surety," are held and firmly bound unto the

as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the amount of _____ Dollars (\$ _____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these obligations.

WHEREAS, Principal has by written agreement dated _____, 20_____, entered into a contract with Owner for the construction of _____ (Insert the name of the Project)

in accordance with Drawings and Specifications prepared by _____ (Insert full name and address of Architect/Engineer)

which contract is by reference made a part hereof, and is hereinafter referred to as the "Contract."

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.
3. No suit or action shall be commenced hereunder by any claimant:
 - a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days, after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were

furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail; postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this ____ day of _____ 20 ____.

PRINCIPAL

[Affix corporate seal]

(Name)_____

(Title)_____

(Witness)

SURETY

[Affix corporate seal]

(Name)_____

(Title)_____

(Witness)

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END OF SECTION

**SECTION 00 62 76.13
SALES TAX FORM**

STATE AND COUNTY SALES/USE TAX STATEMENT AND CERTIFICATION

Owner: _____ Report Sheet Number: _____ of _____
 Project Name: _____ For Period From: _____ to _____
 Contractor: _____ Payment Application Number: _____

Vendor Name/Address	Type of Materials	Invoice Number	Invoice Date	Invoice Taxable Amount	N.C. State Tax	County Tax	County Name
TOTALS							

I hereby certify that the above listings include all materials purchased by us and incorporated into the above referenced project for the period stated, became a permanent part of the project, and that the sales tax shown has been paid. The above represents a complete listing of the sales taxes paid for the payment application number indicated.

SWORN AND SUBSCRIBED BEFORE ME
 ON THIS ___ DAY OF ___, 20__
 BY: _____ TITLE: _____

NOTARY PUBLIC: _____
 MY COMMISSION EXPIRES: _____ (seal/)>

SECTION 00 72 00
GENERAL CONDITIONS

NOTICE OF DISCLAIMER

TAKE NOTICE, that these General Conditions may contain language and Article, Section or Paragraph headings or names which appear similar to or the same as the provisions of the "General Conditions of the Contract for Construction", published by the American Institute of Architects, AIA Document A-201.

TAKE NOTICE, however, that these General Conditions are substantially and materially different in many respects from the AIA Document A-201 and that certain additions, deletions or other modifications have been made to provisions similar to those contained in the AIA Document. This document, further, contains provisions, which do not appear in the AIA document.

The use of any language or Article or Paragraph format similar to or the same as AIA Document A-201 does not constitute an endorsement by the American Institute of Architects of this document.

**GENERAL CONDITIONS OF THE
CONTRACT FOR CONSTRUCTION**

TABLE OF ARTICLES

<ul style="list-style-type: none"> 1. CONTRACT DOCUMENTS 2. DESIGN CONSULTANT 3. OWNER 4. CONTRACTOR 5. SUBCONTRACTORS 6. WORK BY OWNER OR BY SEPARATE CONTRACTORS 7. MISCELLANEOUS PROVISIONS 8. TIME 	<ul style="list-style-type: none"> 9. PAYMENTS AND COMPLETION 10. PROTECTION OF PERSONS AND PROPERTY 11. INSURANCE 12. CHANGES IN THE WORK 13. UNCOVERING AND CORRECTION 14. TERMINATION OF THE CONTRACT 15. DISPUTE RESOLUTION
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ARTICLE 1

CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 AS SHOWN, AS INDICATED, AS DETAILED: These words, and words of like implication, refer to information contained in Drawings and Specifications describing the Work, unless explicitly stated otherwise in the Contract Documents.

1.1.2 CLAIM: A Claim as used in the Contract is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of contract terms, payment of money, a credit against the payment of money, extension of 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

- parties to a contract involved in the Owner's construction and repair projects arising out of or relating to the Contract or the construction process.
- 1.1.3 **CONTRACT:** The Contract is the sum of all the Contract Documents. The Contract represents the entire and integrated agreement between the Owner and the Contractor and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Paragraph 1.1.4. The Contract may also be referred to in the Contract Documents as "this Contract", "this Agreement" or "the Agreement".
- 1.1.4 **CONTRACT DOCUMENTS:** The Contract Documents consist of the Owner-Contractor Agreement, the Conditions of the Contract (General and Supplemental Conditions), the Plans, Drawings, and Specifications, and all Addenda thereto issued prior to and all Modifications thereto issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties; (2) a Change Order or a Construction Change Directive issued pursuant to the provisions of Article 12; (3) a written interpretation issued by the Design Consultant pursuant to Paragraph 2.2.7; or (4) a written order for a minor Change in the Work issued pursuant to Section 12.4. The Contract Documents do not include any other documents including but not limited to soils, geotechnical or other reports, surveys and analysis, which may be printed, bound or assembled with the Contract Documents, or otherwise made available to the Contractor for review or information under this Contract, unless specifically enumerated and directly incorporated by reference in the Contract Documents.
- 1.1.5 **HE/HIS:** The term He or His is not intended to be gender specific.
- 1.1.6 **MANUFACTURER:** An individual, company, or corporation who manufactures, fabricates, or assembles a standard product. A standard product is one that is not made to special design, and if furnished by either direct sale or by contract to the Contractor, Subcontractor or Vendor.
- 1.1.7 **MATERIAL SUPPLIER OR VENDOR:** A person or organization who supplies, but who is not responsible for the installation of, materials, products and equipment.
- 1.1.8 **NOTICE:** The term Notice as used herein shall mean and include written notice. Notice shall be deemed to have been given when delivered to the address of the person, firm or corporation for whom intended, or to his, their or its duly authorized agent, representative or officer; or when enclosed in a postage prepaid wrapper or envelope addressed to such person, firm or corporation at his, their or its Notice Address and deposited in a United States mailbox by registered or certified mail. To "Notify" means to give Notice. The Notice Addresses for the Owner and Contractor are stated in the Owner-Contractor Agreement and may be changed by a party by giving Notice to the other of such change.
- 1.1.9 **PLANS OR DRAWINGS:** All drawings or reproduction of drawings pertaining to the Work.
- 1.1.10 **PRODUCT:** The term Product includes materials, systems and equipment.
- 1.1.11 **PROJECT:** The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part.
- 1.1.12 **PROPOSAL:** A complete and properly signed document whereby the Contractor proposes to provide additional or a reduced scope of construction work on the Project for the sums stipulated therein, supported by data required by the Design Consultant or Owner.

- 1.1.13 PROVIDE: As a directive to the Contractor, and as pertaining to labor, materials or equipment, "provide" means "furnish and install completely".
- 1.1.14 SPECIFICATIONS: Descriptions, provisions and requirements, pertaining to method and manner of performing the Work, or to quantities and qualities of materials or equipment to be furnished under terms of the Contract.
- 1.1.15 WORK: The Work comprises the construction and services required of the Contractor by the Contract Documents and includes all labor, supplies and other facilities or things necessary to produce such construction, and all materials, equipment, and supplies incorporated or to be incorporated in such construction.
- 1.2 EXECUTION, CORRELATION AND INTENT
- 1.2.1 The Contractor and Owner acknowledge that neither these General Conditions, nor any other Contract Document shall be construed against the Owner due to the fact that they may have been drafted by the Owner or the Owner's agent. For the purposes of construing these General Conditions, and any other Contract Document, both the Contractor and the Owner shall be considered to have jointly drafted them.
- 1.2.2 The Owner-Contractor Agreement shall be signed in not less than three (3) copies by the Owner and Contractor, and each of which shall be deemed an original, but all of which shall constitute one and the same instrument.
- 1.2.3 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.
- 1.2.4 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any 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 intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings unless otherwise specifically defined herein. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit or cast light upon the interpretation of the provisions to which they refer.
- 1.2.5 The organization of the Specifications into divisions, sections and articles, and the arrangement of Drawings are for convenience only. The Contractor may subcontract the Work in such divisions as he sees fit consistent with applicable law and he is ultimately responsible for furnishing all of the Work.
- 1.2.6 Anything shown on the Drawings and not mentioned in the Specifications or mentioned in the Specifications and not shown on the Drawings shall have the same effect as if shown or mentioned respectively in both. Detailed specifications take priority over general specifications and detailed drawings take precedence over general drawings. Any Work shown on one drawing shall be construed to be shown in all drawings. If any portion of the Contract Documents shall be in conflict with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence: The Owner-Contractor

Agreement; the Supplemental Conditions; the General Conditions; the Specifications; the Drawings. The Contractor shall notify the Design Consultant and the Owner of all such inconsistencies promptly. Any such conflict or inconsistency between or in the Drawings or Specifications shall be submitted by the Contractor promptly to the Owner and Design Consultant and the Design Consultant's decision thereon shall be final and conclusive.

- 1.2.7 The Contractor agrees that nothing contained in the Contract Documents or any contract between the Owner and the Design Consultant shall create any contractual relationship between the Design Consultant and the Contractor, or between the Design Consultant and any Subcontractor or Sub-subcontractors. The Contractor acknowledges and agrees that this Contract is not intended to create, nor shall any provision be interpreted as creating, any contractual relationship between the Owner or Contractor and any third parties.
- 1.2.8 The provisions of this Contract cannot be amended, modified, varied or waived in any respect except by a Modification. The Contractor is hereby given notice that no person has authority to orally waive, or to release the Contractor from any of the Contractor's duties or obligations under or arising out of this Contract. Any waiver, approval or consent granted by Modification to the Contractor shall be limited to those matters specifically and expressly stated thereby to be waived, approved or consented to and shall not relieve the Contractor of the obligation to obtain any future waiver, approval or consent.
- 1.2.9 Any material or operation specified by reference to published specifications of a Manufacturer, a society, an association, a code, or other published standard, shall comply with requirements of the listed document which is current on date the Owner received bids for the construction of the Project. In case of a conflict between referenced document and the Specifications, Specifications shall govern. In case of a conflict between such listed documents, the one having more stringent requirements shall govern.
- 1.2.10 The Contractor, if requested, shall furnish an affidavit from each or any Manufacturer certifying that materials or products delivered to the job meets requirements specified.
- 1.3 OWNERSHIP AND USE OF DOCUMENTS
- 1.3.1 All Drawings, Specifications and copies thereof furnished by the Design Consultant are and shall remain the property of the Owner. They are to be used by Contractor only with respect to the Project and are not to be used by Contractor on any other project. With the exception of one contract set for each party to the Contract, such documents are to be returned or suitably accounted for to the Owner on request at the completion of the Work. Submission 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 Owner's rights or the Design Consultant's common law copyright or other reserved rights.

ARTICLE 2

THE DESIGN CONSULTANT

2.1 DEFINITIONS

- 2.1.1 The term "Design Consultant" or "A/E" or "Architect" or "Engineer" as used or set forth in the Contract Documents, shall mean the entity and its consultants or agents, or their duly authorized representatives, that is responsible for designing or engineering the Work, and performing the activities specified herein, and in the Agreement for Design Consultant Services, including any

consultants to said entity or firm acting within the scope of their agreements with the Design Consultant. Such firm or agency and its representatives shall act severally within the scope of particular duties entrusted to them, unless otherwise provided for in the Contract Documents or in the Agreement for Design Consultant Services.

- 2.1.2 The Design Consultant may be identified in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The Design Consultant is further described as and, throughout this document, shall mean one or both of the following:
- 2.1.2.1 ARCHITECT, a person or other legal entity lawfully licensed to practice architecture in the State wherein the Project is located; or
- 2.1.2.2 ENGINEER, a person or other legal entity lawfully licensed to practice engineering in the State wherein the Project is located.
- 2.2 SERVICES OF THE DESIGN CONSULTANT
- 2.2.1 The Design Consultant will provide certain services as hereinafter described and further described in the Agreement for Design Consultant Services.
- 2.2.2 Should errors, omissions, or conflicts in the Drawings, Specifications, or other Contract Documents prepared by or on behalf of the Design Consultant be discovered, the Design Consultant will prepare such amendments or supplementary documents and provide consultation as may be required.
- 2.2.3 The Design Consultant will visit the site at intervals appropriate to the stage of construction to familiarize itself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. The Design Consultant will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work, but it shall make as many inspections as may reasonably be required to fulfill its obligations to the Owner. On the basis of such on-site observations, the Design Consultant and his consultants shall endeavour to guard the Owner against defects and deficiencies in the Work. The Design Consultant will conduct the weekly construction meeting and shall be responsible for preparing accurate and complete minutes of all such meetings and other Project meetings and distributing same to all participants.
- 2.2.4 The Design Consultant will render written field reports to the Owner in the form required by the Owner relating to the periodic visits and inspections of the Project required by Paragraph 2.2.3.
- 2.2.5 The Design Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Design Consultant will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any portion of the Work.
- 2.2.6 The Design Consultant shall at all times have access to the Work wherever it is in preparation or progress. The Contractor shall provide safe facilities for such access so the Design Consultant may perform his functions under the Contract Documents.

- 2.2.7 As required, the Design Consultant will render to the Owner, within a reasonable time, interpretations concerning the design and other technical aspects of the Work and the Contract Documents.
- 2.2.8 All communications, correspondence, submittals, and documents exchanged between the Design Consultant and the Contractor in connection with the Project shall be copied to the Owner, unless the Owner provides otherwise. Further, all communications, correspondence, submittals and documents transmitted from the Owner or Design Consultant will be directed to the Contractor and copied to the Owner or Design Consultant.
- 2.2.9 All interpretations and decisions of the Design Consultant shall be consistent with the intent of and reasonably inferable from the Contract Documents.
- 2.2.10 The Design Consultant's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.
- 2.2.11 If the Design Consultant observes any Work that does not conform to the Contract Documents, the Design Consultant shall report this observation to the Owner. The Design Consultant will prepare and submit to the Owner "punch lists" of the Contractor's work, which is not in conformance with the Contract Documents. The Owner will transmit such "punch lists" to the Contractor.
- 2.2.12 The Design Consultant has the authority to condemn or reject any or all of the Work on behalf of the Owner when, in its opinion, the Work does not conform to the Contract Documents. Whenever, in the Design Consultant's reasonable opinion, it is considered necessary or advisable for the implementation of the intent of the Contract Documents, the Design Consultant will have the authority to require special inspection or testing of any portion of the Work in accordance with the provisions of the Contract Documents whether or not such portion of the Work be then fabricated, installed or completed.
- 2.2.13 The Design Consultant will review the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and for general compliance with the Contract Documents. Such action shall be taken within fourteen (14) days of receipt unless otherwise authorized by the Owner.
- 2.2.14 The Owner will establish with the Design Consultant procedures to be followed for review and processing of all Shop Drawings, catalogue submittals, project reports, test reports, maintenance manuals, and other necessary documentation, as well as requests for changes and applications for extensions of time.
- 2.2.15 The Design Consultant will prepare Change Orders and Construction Change Directives when requested by the Owner.
- 2.2.16 The Design Consultant and the Owner will conduct inspections to determine the dates of Substantial Completion and Final Completion. The Design Consultant will issue a final Certification of Payment.
- 2.2.17 The Design Consultant will prepare three (3) printed copies and one (1) electronic computer file compatible with the latest version of AutoCAD, or other program designated by Owner, showing significant Changes in the Work made during the construction process, based on neatly and clearly marked-up Drawings, prints, and other data furnished by the Contractor(s) and the

applicable Addenda, clarifications and Change Orders which occurred during the Project. The Design Consultant will also provide the Owner assistance in the original operation of any equipment or system such as initial start-up, testing, adjusting, and balancing.

- 2.2.18 In case of the termination of the employment of the Design Consultant, the Owner may appoint a Design Consultant whose status under the Contract Documents shall be that of the former Design Consultant.

ARTICLE 3

OWNER

3.1 DEFINITION

- 3.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and may be referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner or his authorized representative or agent. The phrase "Owner or its agent" as used in this Agreement, does not include the Separate Contractors or their Subcontractors.

3.2 INFORMATION, SERVICES AND RIGHTS OF THE OWNER

- 3.2.1 The Owner will provide administration of the Contract as herein described. The Design Consultant shall also provide aspects of administration of the Contract as herein described or as specified in the Agreement for Design Consultant Services.
- 3.2.2 The Owner shall at all times have access to the Work whenever it is in preparation or progress. The Contractor shall provide safe facilities for such access.
- 3.2.3 The Owner shall not be responsible for or have control or charge of the construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, and will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.
- 3.2.4 The Owner will have authority to require special inspection or testing of portions of the Work to the same extent as the Design Consultant in accordance with Paragraph 2.2.12 whether or not such portion of the Work be then fabricated, installed, or completed. However, neither the Owner's authority to act under Paragraph 3.2.4, nor any decision made by the Owner in good faith either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Owner to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.
- 3.2.5 The Owner shall have the authority and discretion to call, schedule, and conduct job meetings to be attended by the Contractor, representatives of his Subcontractors, and the Design Consultant, to discuss such matters as procedures, progress, problems, and scheduling.
- 3.2.5.1 The Contractor is requested and required to attend weekly job site progress conferences as called by the Design Consultant. The Contractor shall be represented at these job progress conferences by project personnel authorized by the Contractor to make schedule and financial decision and by project personnel representatives. These meetings shall be open to Subcontractors, Material Suppliers, and any others who can contribute shall be encouraged by the Contractor to attend. It shall be the principal purpose of these meetings, or conferences, to affect coordination,

- cooperation and assistance in every practical way toward the end of maintaining progress of the Project on schedule and to complete the Project within the specified Contract Time. The Contractor shall be prepared to assist progress of the Work as required in his particular contract and to recommend remedial measures for the correction of progress as may be appropriate. The Design Consultant shall be the coordinator of the conferences and shall preside as chairman.
- 3.2.5.2 If the Project is awarded as a single prime construction contract, the Design Consultant shall determine which, if any, Subcontractors and/or Material Suppliers shall be required to attend weekly job site progress conferences. The Contractor shall comply with this request and the meeting shall be conducted as described in Subparagraph 3.2.5.1.
- 3.2.6 The Owner will establish procedures to be followed for processing all Shop Drawings, catalogues, and other project reports, and other documentation, test reports, and maintenance manuals.
- 3.2.7 The Owner and Design Consultant will review all requests for changes and shall implement the processing of Change Orders, including applications for extension of the Contract Time.
- 3.2.8 The Owner, will not be responsible for the failure of the Contractor to plan, schedule, and execute the Work in accordance with the approved schedule or the failure of the Contractor to meet scheduled Completion Dates or the failure of the Contractor to schedule and coordinate the Work of his own trades and Subcontractors or to coordinate and cooperate with any Separate Contractors.
- 3.2.9 The Owner, in consultation with the Design Consultant, will review and process all Applications for Payment by the Contractor, including the final Application for Payment.
- 3.2.10 The Owner and Design Consultant shall not be responsible or liable to Contractor for the acts, errors or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons performing any of the Work or working on the Project.
- 3.2.11 The Owner shall furnish surveys describing the physical characteristics and legal limitations for the site of the Project, which are in its possession and are relevant to the Work.
- 3.2.12 The Owner shall secure and pay for necessary easements, required for permanent structures or for permanent changes in existing facilities.
- 3.2.13 The Owner shall furnish information or services under the Owner's control with reasonable promptness to avoid unreasonable delay in the orderly progress of the Work.
- 3.2.14 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, copies of Drawings and Specifications in accordance with the Supplemental Conditions.
- 3.2.15 The Owner will make reasonable efforts to make available for the Contractor's reasonable review, at the Owner's offices or together with the Contract Documents, certain boring logs, geotechnical, soils and other reports, surveys and analyses pertaining to the Project site of which the Owner is aware, has in its possession and are relevant to the Work. Any boring logs that are provided to the Contractor are only intended to reflect conditions at the locations of the borings and do not necessarily reflect site conditions at other locations. Any reports, surveys and analyses provided by Owner are for the Contractor's information only, and their accuracy and completeness are not guaranteed or warranted by the Owner or the Design Consultant, and such reports are not adopted by reference into, nor are they part of the Contract Documents.

Notwithstanding any factual statement, conclusion, or any language or recommendations contained in such reports, the Contractor shall not rely upon the accuracy or completeness of any reports surveys and analyses.

3.2.16 The foregoing rights are in addition to other rights of the Owner enumerated herein and those provided by law.

3.3 OWNER'S RIGHT TO STOP OR TO SUSPEND THE WORK

3.3.1 If the Contractor fails to correct defective Work as required by Section 13.2 or fails to carry out the Work or supply labor and materials in accordance with the Contract Documents, the Owner by a written Notice may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

3.3.2 The Owner may order the Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as he may determine to be appropriate for the convenience of the Owner.

3.3.3 If the performance of all or any part of the Work (including the work of the Contractor and its Subcontractors) is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Owner or the Design Consultant, or by failure of any one of them to act within the time specified in this Contract (or if no time is specified, within a reasonable time), an adjustment shall be made for an increase in the actual time required for performance of the Work by the Contractor, due solely to such unreasonable suspension, delay, or interruption and the Contract modified in writing accordingly. However, no Claim shall be made under this Paragraph for any suspension, delay, or interruption pursuant to Paragraph 3.4.1, or for which Claim is provided or excluded under any other provision of this Contract. No Claim under this Paragraph shall be allowed on behalf of the Contractor or its Subcontractors, unless within twenty (20) days after the act or failure to act involved, and for continuing or ongoing acts or failures to act within twenty (20) days of the first day of the act or failure to act, the Contractor submits to the Owner a written statement setting forth, as fully as then practicable, the extent of such Claim, and unless the Claim is asserted in writing within thirty (30) days after the termination of such suspension, delay, or interruption. For continuing or ongoing acts or failures to act, the Contractor shall update its written statement every twenty (20) days until the suspension, delay or interruption is terminated. The Contractor shall waive any and all Claims under this Paragraph 3.3.3 which are not filed in strict conformance with Paragraph 3.3.3. The Contractor shall indemnify, defend and hold the Owner harmless from any Claim by a Subcontractor that is waived because it is not filed in strict conformance with this Paragraph 3.3.3 or any other provision of the Contract regarding Claims.

3.3.4 In the event of a suspension of the Work or delay or interruption of the Work per Paragraph 3.3.3, the Contractor will and will cause his Subcontractors to protect carefully his, and their, materials and Work against damage, loss or injury from the weather and maintain completed and uncompleted portions of the Work as required by the Contract Documents. If, in the opinion of the Owner, any Work or material shall have been damaged or injured by reason of failure on the part of the Contractor or any of his Subcontractors to so protect same, such Work and materials shall be removed and replaced at the expense of the Contractor.

3.3.5 No Claim by the Contractor under Paragraph 3.3.3 shall be allowed if asserted after final payment under this Contract or if it is not asserted in strict conformance with Paragraph 3.3.3.

3.4 OWNER'S RIGHT TO CARRY OUT THE WORK

- 3.4.1 If the Contractor defaults or otherwise neglects to carry out the Work in accordance with the Contract Documents and fails within ten (10) days after the date written Notice is given by the Owner, with a copy of such Notice sent to the Contractor's Surety, to commence and continue remedy of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedy he may have, make good such deficiencies and may further elect to complete all Work thereafter through such means as the Owner may select, including the use of a new contractor pursuant to Paragraph 3.4.2. In such case, the Owner shall provide Notice to the Contractor's Surety and an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Design Consultant's additional services made necessary by such default, neglect or failure and any other damages suffered by Owner as a result of Contractor's breach, including but not limited to Owner's reasonable attorney's fees and litigation costs and expenses. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor or its Surety shall pay the difference to the Owner. Notwithstanding the Owner's right to carry out a portion of the Work, warranty, maintenance and protection of the Work remains the Contractor's and Surety's responsibility. Further, the provisions of this Paragraph do not affect the Owner's right to require the correction of defective or non-conforming Work in accordance with Section 13.2.
- 3.4.2 Whenever the Contractor shall be, and declared by the Owner to be in default under the Contract, the Owner having substantially performed Owner's obligations thereunder, the Surety shall promptly remedy the default, or shall be liable to Owner for damages pursuant to the Performance Bond and as provided by law. Any action by Surety or by Owner against the Surety shall not relieve Contractor of its duties, responsibilities and liabilities to Owner pursuant to the Contract or as allowed by law.

ARTICLE 4

CONTRACTOR

4.1 DEFINITION

- 4.1.1 The Contractor is the person or organization identified as such in the Owner-Contractor Agreement and may be referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative, who shall have authority to bind the Contractor in all matters pertinent to the Contract.
- 4.1.2 The Contract is not one of agency by the Contractor for Owner but one in which Contractor is engaged independently in the business of providing the services and performing the Work herein described as an independent contractor.

4.2 REVIEW OF CONTRACT DOCUMENTS

- 4.2.1 The Contractor represents that prior to executing this Contract, the Contractor carefully reviewed and studied the Contract Documents and notified the Owner and Design Consultant of any errors, inconsistencies or omissions of which the Contractor is aware. The Contractor agrees to continuously and carefully study and compare the Contract Documents after the execution of this Contract and shall at once report to the Owner and Design Consultant any

error, inconsistency or omission he may discover, including, but not limited to, any requirement which may be contrary to any law, ordinance, rule, regulation, building code, or order of any public authority bearing on the Work. If the Contractor has reported in writing an error, inconsistency or omission, has promptly stopped the affected Work until otherwise instructed, and has otherwise followed the instructions of the Owner, the Contractor shall not be liable to the Owner or the Design Consultant for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the Work at any time without it being specified in Contract Documents and, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

4.2.2 The Contractor and his Subcontractors shall keep at the site of the Work at least one copy of the Drawings and Specifications and shall at all times give the Owner, the Design Consultant, inspectors, as well as other representatives of the Owner access thereto.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for and have control over all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

4.3.1.1 It shall be the Contractor's responsibility to schedule the Work; to maintain a progress schedule for the Project; and to notify the Design Consultant and the Owner of any changes in the progress schedule. He shall be responsible for providing adequate notice to all Subcontractors to insure efficient continuity of all phases of the Project. The Contractor is responsible for keeping the Owner and Design Consultant fully informed as to the work progress, including immediate notification of any work progress changes.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and Sub-subcontractors, Suppliers, their agents and employees, and other persons performing any of the Work and for their compliance with each and every requirement of the Contract Documents, in the same manner as if they were directly contracted by the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the Work in accordance with the Contract Documents either by the acts, failures to act or duties of the Owner or the Design Consultant in their administration of the Contract, or by inspections, tests or approvals (or the lack thereof) required or performed under Section 7.6 by persons other than the Contractor.

4.3.4 Before starting a section of the Work, the Contractor shall carefully examine all preparatory work that has been executed to receive his work to see that it has been completed in accordance with the Contract Documents. He shall check carefully, by whatever means are required, to ensure that his work and adjacent, related work will finish to proper and required standards for quality, contours, planes, and levels.

4.3.5 The Contractor understands and agrees that the Owner and Design Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and they will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Owner and the Design Consultant will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

4.3.6 The Contractor shall not use or provide Subcontractor equipment, materials, methods or persons to which Owner and Design Consultant have a reasonable objection and shall remove no portion of the Work or stored materials from the site of the Work, except for defective Work the Contractor may be required to replace or repair as set forth herein.

4.3.7 The Contractor shall verify all grades, lines, levels and dimensions as indicated and shown on the Drawings and in the Specifications prior to beginning any portion of the Work and shall immediately report in writing any errors or inconsistencies to the Design Consultant before commencing that portion of the Work.

4.4. CONTRACTOR'S REPRESENTATIONS

4.4.1 By entering into this Contract with the Owner, the Contractor represents and warrants the following, together with all other representations and warranties in the Contract Documents:

- .1 That he is experienced in and competent to perform the type of work required and to furnish the Subcontractors, materials, supplies, equipment and services to be performed or furnished by him;
- .2 That he is financially solvent, able to pay his debts as they mature, and possessed of sufficient working capital to initiate and complete the Work required under the Contract;
- .3 That he is familiar with all Federal, State, County, municipal and department laws, ordinances, permits, regulations, building codes and resolutions which may in any way affect the Work or those employed therein, including but not limited to any special laws or regulations relating to the Work or any part thereof;
- .4 That such temporary and permanent Work required by the Contract Documents will be satisfactorily constructed and fit for use for its intended purpose and that such construction will not injure any person, or damage any property;
- .5 That he has carefully examined the Contract Documents and the site of the Work and that from his own investigations, he has satisfied himself and made himself familiar with: (1) the nature and location of the Work; (2) the character, quality and quantity of surface and subsurface materials likely to be encountered, including, but not limited to, all structures and obstructions on or at the Project site, both natural and man-made; (3) the character of equipment and other facilities needed for the performance of the Work; (4) the general and local conditions including without limitation its climatic conditions, the availability and cost of labor and the availability and cost of materials, tools and equipment; (5) the quality and quantity of all materials, supplies, tools, equipment, labor and professional services necessary to complete the Work in the manner required by the Contract Documents; and (6) all other matters or things which could in any manner affect the performance of the Work;
- .6 That he will fully comply with all requirements of the Contract Documents;
- .7 That he will perform the Work consistent with good workmanship, sound business practice, and in the most expeditious and economical manner consistent with the best interests of the Owner;

- .8 That he will furnish efficient business administration and experienced project management and supervision, and an adequate supply of workers, equipment, tools and materials at all times;
- .9 That he has carefully reviewed the Work required and that the Work can be planned and executed in a normal and orderly sequence of Work and reasonably scheduled so as to ensure completion of the Work in accordance with the Contract Documents, allowing for normal and reasonably foreseeable weather, labor and other delays, interruptions and disruptions of the Work;
- .10 That he will complete the Work within the Contract Time and all portions thereof within any required Completion Dates;
- .11 That his Contract Sum is based upon the labor, materials, systems and equipment required by the Contract Documents, without exception; and
- .12 That he will make a good faith effort to utilize minority and Historically Underutilized Businesses (HUBs) as defined and required in N.C. Gen. Stat. 143-128.2 to -128.4, and as described in the Contract Documents.

4.5 LABOR AND MATERIALS

- 4.5.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, supplies, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary or proper for or incidental to the execution and completion of the Work required by and in accordance with the Contract Documents and any applicable code or statute, whether specifically required by the Contract Documents or whether their provision may reasonably be inferred as necessary to produce the intended results, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Final payment will not be made until the Work is so completed and Contractor has otherwise complied with the Contract Documents in full.
- 4.5.2 The Contractor shall at all times enforce strict discipline and good order among his employees and Subcontractors performing any of the Work and shall not employ or contract with on the Work any unfit person or entity or anyone not skilled in the task assigned to him. The Owner may, by Notice, require the Contractor to remove from the Work any employee or employee of a Subcontractor performing any of the Work, that the Owner deems incompetent, careless or otherwise objectionable.
- 4.5.3 The Contractor shall be responsible for ensuring that the Work is completed in a skilful and workmanlike manner.
- 4.5.4 All equipment, apparatus and/or devices of any kind to be incorporated into the Work that are shown or indicated on the Drawings or called for in the Specifications or required for the completion of the Work shall be entirely satisfactory to the Owner and the Design Consultant as regards operations, capacity and/or performance. No approval, either written or verbal, of any drawings, descriptive data or samples of such equipment, apparatus and/or device shall relieve the Contractor of his responsibility to turn over the same in good working order for its intended purpose at the completion of the Work in complete accordance with the Contract Documents. Any equipment, apparatus and/or device not fulfilling these requirements shall be removed and replaced by proper and acceptable equipment, etc. or put in good working order satisfactory to the Owner and Design Consultant without additional cost to the Owner.

4.6 WARRANTY

- 4.6.1 The Contractor warrants to the Owner and the Design Consultant that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all workmanship will be in accordance with generally accepted industry standards, free from faults and defects and in conformance with the Contract Documents and all other warranties and guaranties specified therein. Where no standard is specified for such workmanship or materials, they shall be the best of their respective kinds. All Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Owner or the Design Consultant, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of Article 13.
- 4.6.2 The Contractor will be required to complete the Work specified and to provide all items needed for construction of the Project, complete and in good order.
- 4.6.3 The warranties set forth in this Section 4.6 and elsewhere in the Contract Documents shall survive Final Completion of the Work under Section 9.9.
- 4.6.4 The Contractor guarantees and warrants to the Owner all Work as follows:
- .1 That all materials and equipment furnished under this Contract will be new and the best of its respective kind unless otherwise specified;
 - .2 That all Work will be in accordance with generally accepted industry standards and free of omissions and faulty, poor quality, imperfect and defective material or workmanship;
 - .3 That the Work shall be entirely watertight and leak proof in accordance with all applicable industry customs and practices, and shall be free of shrinkage and settlement;
 - .4 That the Work, including but not limited to, mechanical and electrical machines, devices and equipment, shall be fit and fully usable for its intended and specified purpose and shall operate satisfactorily with ordinary care;
 - .5 That consistent with requirements of the Contract Documents, the Work shall be installed and oriented in such a manner as to facilitate unrestricted access for the operation and maintenance of fixed equipment;
 - .6 That the Work will be free of abnormal or unusual deterioration which occurs because of poor quality materials, workmanship or unsuitable storage; and
 - .7 That the products or materials incorporated in the Work will not contain asbestos.
- 4.6.5 All Work not conforming to guarantees and warranties specified in the Contract Documents, including substitutions not properly approved and authorized, may be considered defective. If required by the Design Consultant or Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.
- 4.6.5.1 The Contractor will submit a written affidavit certifying that none of the materials incorporated in the Project contain asbestos.

- 4.6.6 If, within one (1) year after the date of Substantial Completion of the Work or designated portion thereof as defined in Paragraph 8.1.3 or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective, not in accordance with the Contract Documents, or not in accordance with the guarantees and warranties specified in the Contract Documents, the Contractor shall correct it within five (5) working days or such other period as mutually agreed, after receipt of Notice from the Owner to do so. The Owner shall give such Notice with reasonable promptness after discovery of the condition. For items that remain incomplete or uncorrected on the date of Substantial Completion, the one (1) year warranty shall begin on the date of Final Completion of the Work or upon correction of the defective Work.
- 4.6.7 If at any time deficiencies in the Work are discovered which are found to have resulted from fraud or misrepresentation, or an intent or attempt to or conspiracy to defraud the Owner by the Contractor, any Subcontractor or Supplier, the Contractor will be liable for replacement or correction of such Work and any damages which Owner has incurred related thereto, regardless of the time limit of any guarantee or warranty.
- 4.6.8 Any materials or other portions of the Work, installed, furnished or stored on site which are not of the character or quality required by the Specifications, or are otherwise not acceptable to the Design Consultant or the Owner, shall be immediately removed and replaced by the Contractor to the satisfaction of the Design Consultant and Owner, when notified to do so by the Design Consultant or Owner.
- 4.6.9 If the Contractor fails to correct defective or non-conforming Work as required by Paragraph 4.6.6, or if the Contractor fails to remove defective or non-conforming Work from the site, as required by Paragraph 4.6.8, the Owner may elect to either correct such Work in accordance with Section 3.4 or remove and store materials and equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten (10) days thereafter, the Owner may upon ten (10) additional days written Notice sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Design Consultant's additional services and Owner's reasonable attorney's fees made necessary thereby. If such proceeds of sale do not cover all costs, which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.
- 4.6.10 The Contractor shall bear the cost of making good all of the Work of the Owner, Separate Contractors or others, destroyed or damaged by such correction or removal required under this Article 4, Article 13 or elsewhere in the Contract Documents.
- 4.7 TAXES
- 4.7.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time the Owner received bids for the construction of the Project, whether or not yet effective.
- 4.7.2 Sales and Use Tax. Contractor shall be responsible for complying with any applicable sales and use tax obligations imposed by Chapter 105, Article 5 of the North Carolina General Statutes. Where Contractor has been contracted with to oversee "new construction" or "reconstruction"

as defined in G.S. 105-164.4H, Contractor shall be responsible for issuing and maintaining an Affidavit of Capital Improvement.

4.8 PERMITS, FEES AND NOTICES

4.8.1 The Owner shall be responsible for fees associated with permits and approval of the Drawings including but not limited to building permit, utility impact fees, stormwater permit and driveway permit.

4.8.2 The Contractor is responsible for all fees, permits and other costs associated with temporary utilities, including but not limited to installation, use, disconnection, removal and/or relocation.

4.8.3 The Contractor will pay for his own license, inspection and re-inspection fees for the proper execution and completion of the Work.

4.8.4 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work, including but not limited to all applicable building codes. If Contractor believes that any part of the Drawings or Specifications are inconsistent with applicable laws, rules, regulations, lawful orders of public authorities or building codes, Contractor shall Notify the Owner and Design Consultant of such inconsistencies immediately.

4.9 ALLOWANCES

4.9.1 The Contractor shall include in the Contract Sum all Allowances stated in the Contract Documents. Items covered by these Allowances shall be supplied for such amount and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

4.9.2 Unless otherwise provided in the Contract Documents:

- .1 Allowances for Work: These allowances shall cover the cost to the Contractor for the materials and equipment required by the allowance delivered at the site, all applicable taxes, unloading, uncrating and storage, protection from elements, labor, installation and finishing and other expenses and time required to complete the installation, and a fixed percentage for overhead and profit as defined in Article 12.
- .2 Allowances for Products/Materials: Allowance includes the cost of the product, delivery to the site and applicable taxes. The Contractor's costs for unloading and handling on the site, labor, installation, time, overhead, profit and other expenses contemplated for the material allowance shall be included in the Contract Sum and not in the allowance;
- .3 Whenever the cost is more than or less than the Allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expense.

4.10 SUPERINTENDENT

4.10.1 The Contractor shall employ, and have approved by the Owner, a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the

superintendent shall be as binding as if given to the Contractor. If the Contractor employs more than a single individual in this role, the Owner shall be provided an organizational chart and personnel listing for the staff performing the functions of a superintendent. In such event, all references to the superintendent elsewhere in the Contract Documents shall mean the staff performing the functions of a superintendent.

4.10.2 The superintendent shall be in attendance at the Project site not less than eight (8) hours per day, five (5) days per week, unless the job is closed down due to conditions beyond the control of the Contractor or until termination of the Contract in accordance with the Contract Documents. It is understood that such superintendent shall be acceptable to the Owner and shall be the one who will be continued in that capacity for the duration of the Project, unless he ceases to be on the Contractor's payroll or the Owner otherwise agrees. The superintendent shall not be employed on any other project for or by Contractor or any other entity during the course of the Work.

4.11 PROGRESS SCHEDULE

4.11.1 The Contractor shall prepare and submit to the Owner for the Owner's review and approval an estimated progress schedule for the Work.

4.12 RESPONSIBILITY FOR COMPLETION

4.12.1 The Contractor shall furnish such manpower, materials, facilities and equipment and shall work within the normal scheduled working hours to ensure the performance of the Work within the Completion Dates specified in the Owner-Contractor Agreement. If for any reason the Contractor must work outside of the normal scheduled working hours, a custodian employed by the Owner is required to be in attendance when accessing the work area. The Contractor agrees to reimburse the Owner for such custodian's time. The reimbursement is due with the subsequent payment application.

4.12.2 If it becomes apparent to the Design Consultant or Owner that the Work will not be completed within required Completion Dates, the Contractor agrees to undertake some or all of the following actions, at no additional cost to the Owner, in order to ensure, in the opinion of the Design Consultant and Owner, that the Contractor will comply with all Completion Date requirements:

- .1 Increase manpower, materials, crafts, equipment and facilities;
- .2 Increase the number of working hours per shift, shifts per working day, working days per week, or any combination of the foregoing, including but not limited to night shifts, overtime operations and Sundays and holidays;
- .3 Reschedule activities to achieve maximum practical concurrence of accomplishment of activities;
- .4 Require that his superintendent be at the Project site not less than ten (10) hours per day, six (6) days per week; and
- .5 Reimburse the Owner in accordance with Paragraph 4.12.1 above for all work performed outside of the normal scheduled work hours.

4.12.3 In undertaking the actions required under Paragraph 4.12.1, Contractor shall prepare and adhere

to a recovery schedule if the Project is behind schedule by four (4) or more days.

- 4.12.4 If the actions taken by the Contractor are not satisfactory, the Design Consultant or Owner may direct the Contractor to take any and all actions necessary to ensure completion within the required Completion Dates, without additional cost to the Owner. In such event, the Contractor shall continue to assume responsibility for his performance and for completion within the required dates.
- 4.12.5 If, in the opinion of the Design Consultant or Owner, the actions taken by the Contractor pursuant to this Article or the progress or sequence of the Work are not accurately reflected on the construction schedule, the Contractor shall revise such schedule to accurately reflect the actual progress and sequence of the Work.
- 4.12.6 Failure of the Contractor to substantially comply with the requirements of this Article, may be considered grounds for a determination by the Owner, pursuant to Article 14, that the Contractor is failing to prosecute the Work with such diligence as will ensure its completion within the time specified.
- 4.12.7 The Owner may, at its sole discretion and for any reason, other than due to the fault of Contractor require the Contractor to accelerate the Work by providing overtime, Saturday, Sunday and/or holiday work and/or by having all or any Subcontractors designated by the Owner provide overtime, Saturday, Sunday, and/or holiday work. In the event that the Owner requires such acceleration a Change Order shall be issued in accordance with Article 12.
- 4.12.8 This Section 4.12 does not eliminate the Contractor's responsibility to comply with the local noise ordinances, all highway permit requirements and all other applicable laws, regulations, rules, ordinances, resolutions, and permit requirements.
- 4.12.9 The Contractor will provide the Owner assistance in the original operation of any equipment or system installed as Part of the Work, including initial start-up, testing, adjustment and balancing.
- 4.13 DOCUMENTS AND SAMPLES AT THE SITE
- 4.13.1 The Contractor shall maintain at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be delivered to the Design Consultant upon completion of the Work.
- 4.14 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
- 4.14.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, Manufacturer, Supplier or distributor to illustrate some portion of the Work.
- 4.14.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.
- 4.14.3 Samples are physical examples, which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

- 4.14.4 Manuals are manufacturer's installation, start-up, operating, and maintenance and repair instructions together with parts lists, pictures, sketches and diagrams, which set forth the manufacturer's requirements for the benefit of the Contractor and the Owner.
- 4.14.5 The Contractor shall prepare or have prepared at its expense and shall review, indicate approval thereupon, and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the other work of the Owner or any Separate Contractor, all Shop Drawings, Product Data, Manuals and Samples required by the Contract Documents.
- 4.14.5.1 Unless otherwise directed in writing, the Contractor shall submit no less than three (3) copies of each Shop Drawing, Product Data, or Manuals to the Design Consultant. Routing of said submittals will be from the Contractor to the Design Consultant with a copy of the transmittal to the Owner. The Design Consultant will return one (1) copy of the reviewed submittal to the Contractor.
- 4.14.5.2 Where the Contract calls for the submittal of manufacturer's data to the Design Consultant for information only, such submittals shall be made before the commencement of any portion of the Work requiring such submission. Work performed without benefit of approved Shop Drawings for any portion of the Work is subject to removal and replacement at no cost to the Owner.
- 4.14.5.3 For standard manufactured items not requiring special Shop Drawings for manufacture, Contractor shall submit no less than three (3) copies of Manufacturer's catalogue sheets showing illustrated cuts of item to be furnished, scale details, sizes, dimensions, performance characteristics, capacities, wiring diagrams and controls, and all other pertinent information. One (1) copy of reviewed submissions will be returned to the Contractor.
- 4.14.5.4 Unless otherwise directed in writing, all other Shop Drawings, Contractor shall submit no less than three (3) legible copies of each drawing. Each drawing shall have a clear space for stamps. When phrase "by others" appears on Shop Drawings, the Contractor shall indicate on the Shop Drawing who is to furnish material or operations so marked before submittal. When the Shop Drawings are checked "revise and resubmit", the Contractor shall make corrections and submit new copies for review. The Shop Drawings shall contain the Contractor's "approval" and corrections.
- 4.14.5.5 For use of all trades, the Contractor shall provide such number of Shop Drawings as is required for field distribution.
- 4.14.5.6 The Design Consultant will review submittals and make marks to indicate corrections or revisions required and will stamp each submittal with an action stamp and will mark the stamp with the action required by the Contractor.
- 4.14.5.7 Contractor shall submit names of proposed Manufacturers, Material Suppliers, dealers, who are to furnish materials, fixtures, appliances or other fittings for approval as early as possible, to afford proper investigation and checking.
- 4.14.5.8 Transactions with manufacturers, or Subcontractors, shall be through Contractor.
- 4.14.5.9 Unless otherwise specified, Contractor shall submit samples in duplicate of adequate size showing quality, type, color range, finish, and texture as indicated in the Specifications.

- 4.14.5.10 Where Specifications require manufacturer's printed installation instructions, Contractor shall submit duplicate copies of such instructions for approval.
- 4.14.5.11 When several materials are specified by name for one use, Contractor shall select for use any of those so specified.
- 4.14.5.12 Whenever item or class of material is specified exclusively by trade name, manufacturer's name, or by catalogue reference, Contractor shall use only such item, unless written approval for substitution is secured, as outlined in the Specifications and in Section 4.15 of the General Conditions.
- 4.14.5.13 Contractor shall not order materials until receipt of written approval. Contractor shall furnish materials equal in every respect to approved samples.
- 4.14.6 By approving and submitting Shop Drawings, Product Data, Manuals and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Contractor shall adhere to any supplementary processing and scheduling instructions pertaining to Shop Drawings, which may be issued by the Design Consultant.
- 4.14.6.1 Parts and details not fully indicated on the Drawings shall be detailed by the Contractor in accordance with standard engineering practice. Dimensions on the Drawings, as well as detailed drawings themselves are subject in every case to measurements of existing, adjacent, incorporated and completed, which shall be taken by the Contractor before undertaking any Work dependent on such data.
- 4.14.7 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Design Consultant's review of Shop Drawings, Product Data, Samples or Manuals under Paragraph 2.2.14 unless the Contractor has specifically informed the Design Consultant in writing of such deviation at the time of submission and the Design Consultant has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility to Owner for errors or omissions in the Shop Drawings, Product Data, Samples, or Manuals by virtue of the Design Consultant's review or approval thereof.
- 4.14.8 The Contractor shall make corrections required by the Design Consultant and shall resubmit the required number of corrected copies of Shop Drawings or new Product Data or Samples. The Contractor shall direct specific attention, in writing on resubmitted Shop Drawings, Product Data or Samples or Manuals, to revisions other than those requested by the Design Consultant on previous submittals. Re-submittals necessitated by required corrections due to Contractor's errors or omissions shall not be cause for extension of Contract Time or an increase in the Contract Sum.
- 4.14.8.1 No portion of the Work requiring submission of Shop Drawings, Product Data, Samples or Manuals shall be commenced until the submittal has been approved by the Design Consultant as provided in Article 2. All such portions of the Work shall be in accordance with approved submittals.
- 4.14.9 Shop Drawings, Product Data and Samples shall be dated and shall bear the name of the Project; a description or the names or equipment, materials and items; and complete identification of locations at which materials or equipment are to be installed. Shop Drawings shall be stamped

and signed stating that the Contractor has determined and verified all materials, field measurements, and field construction criteria related thereto and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

4.14.10 Submittals of Shop Drawings, Product Data, Samples or Manuals shall be accompanied by a transmittal letter, in duplicate, containing the name of the Project, the Contractor's name, the number of Shop Drawings, Product Data, Samples, or Manuals, identification of Specification section and other pertinent data.

4.15 EQUAL PRODUCTS AND SUBSTITUTIONS

4.15.1 All materials, supplies and articles furnished under the Contract shall, whenever specified and otherwise practicable, be the standard products of recognized, reputable manufacturers. Unless otherwise specifically provided in the Contract Documents, the naming of a certain brand, make, manufacturer or article, device, product, material, fixture or type of construction shall convey the general style, type, character and standard of quality of the article desired and shall not be construed as limiting competition. The Contractor, in such cases, may with Owner's written approval, use any brand, make, manufacturer, article, device, product, material, fixture, form or type of construction which in the judgment of the Design Consultant is equal to that specified. An item may be considered equal to the item so named or described if, in the opinion of the Owner and Design Consultant (1) it is at least equal in quality, durability, appearance, strength, and design; (2) it will perform at least equally the specific function imposed by the general design for the Work being contracted for or the material being purchased; and (3) it conforms substantially, even with deviations, to the detailed requirements for the item in the Specifications. Approval by the Owner and Design Consultant will be granted based upon considerations of quality, workmanship, economy of operation, suitability for the purpose intended, warranty and acceptability for use on the Project.

4.15.2 To obtain such approval on makes or brands of material other than those specified in Contract Documents, and not previously approved at the time the Owner received bids for the construction of the Project, the Contractor's request for approval of any substitution shall include:

- .1 Complete data substantiating compliance of the proposed substitution with the Contract Documents;
- .2 Product identification including manufacturers' name, address, and phone number;
- .3 Manufacturer's literature showing complete product description, performance and test data, and all reference standards;
- .4 Samples and colors in the case of articles or products;
- .5 Names and addresses of similar projects on which the product was used and date of installation;
- .6 For construction methods, include a detailed description for the proposed method and drawings illustrating same;
- .7 Itemized comparison of proposed substitution with product or method specified and any cost reduction, which shall benefit the Owner;

- .8 Accurate cost data on proposed substitution in comparison with product or method specified;
 - .9 All directions, specifications, and recommendations by manufacturers for installation, handling, storing, adjustment, and operation; and
 - .10 Item by item comparison of characteristics of substitution item with those items specified.
- 4.15.3 The Contractor shall also submit with his request for approval a sworn and notarized statement which shall include all of the following representations by the Contractor, namely that:
- .1 He has investigated the proposed product or method and determined that it is equal or better in all respects to that specified and that it fully complies with all requirements of the Contract Documents;
 - .2 He will meet all contract obligations with regard to this substitution;
 - .3 He will coordinate installation of accepted substitutions into the Work, making all such changes and any required schedule adjustments, at no additional cost to the Owner, as may be required for the Work to be complete in all respects;
 - .4 He waives all Claims for additional costs and additional time related to substitutions, which consequently become apparent. He also agrees to hold the Owner harmless from Claims for extra costs and time incurred by other Subcontractors and suppliers, or additional services which may have to be performed by the Design Consultant, for changes for extra work that may, at some later date, be determined to be necessary in order for the Work to function in the manner intended in the Contract Documents;
 - .5 He will provide the same warranty and guarantee, and perform any work required in accordance therewith, for the substitution that is applicable to the specified item for which the substitution is requested;
 - .6 Material will be installed, handled, stored, adjusted, tested, and operated in accordance with the manufacturers' recommendation and as specified in the Contract Documents.
 - .7 In all cases new materials will be used unless this provision is waived by Notice from the Owner or his Design Consultant, or unless otherwise specified in the Contract Documents;
 - .8 All material and workmanship will be in every respect in accordance with that which, in the opinion of the Owner or Design Consultant, is in conformity with approved modern practice; and
 - .9 He has provided accurate cost data on the proposed substitution in comparison with the product or method specified.
- 4.15.4 Subject to the provisions of any applicable laws, approval for substitutions or equal products shall be at the sole discretion of the Owner, shall be in writing to be effective, and the decision of the Owner shall be final. The Owner or Design Consultant may require tests of all materials proposed for substitution so submitted to establish quality standards, at the Contractor's expense. After approval of a substitution, if it is determined that the Contractor submitted defective information or data regarding the substitution upon which Owner's approval was based, and that

unexpected or unanticipated extensive redesign or rework of the Project will be required in order to accommodate the substitution, or that the substituted item will not perform or function as well as the specified item for which substitution was requested, the Contractor will be required to furnish the original specified item or obtain approval to use another substitution; the Contractor shall pay all costs, expenses or damages associated with or related to the unacceptability of such a substitution and the resultant utilization of another item and no time extension shall be granted for any delays associated with or related to such substitution.

4.15.5 If a substitution is approved, no further change in brand or make will be permitted unless satisfactory, written evidence is presented to and approved by the Owner that the manufacturer cannot make scheduled delivery of the approved substituted item. The Owner will not consider substitutions for approval if:

- .1 The proposed substitution is indicated or implied on the Contractor's Shop Drawing or product data submittal and has not been formally submitted for approval by the Contractor in accordance with the above-stated requirements, or
- .2 Acceptance of the proposed substitution will require substantial design revisions to the Contract Documents or is otherwise not acceptable to the Owner and Design Consultant.

4.15.6 Except as otherwise provided for by the provisions of any applicable laws, the Contractor shall not have any right of appeal from the decision of the Owner rejecting any materials submitted if the Contractor fails to obtain the approval for substitution under this Article.

4.16 USE OF SITE

4.16.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, easements, right-of-way agreements and within the limits of construction as shown on the Contract Documents. The Contractor shall not unreasonably encumber the site, in the opinion of the Owner, with any materials, equipment or trailers nor shall he block the entrances or otherwise prevent reasonable access to the site, other working and parking areas, completed portions of the Work and/or properties, storage areas, areas of other facilities that are adjacent to the worksite. If the Contractor fails or refuses to move said material, equipment or trailers within twenty four (24) hours of notification by the Owner, to so do, the Owner shall have the right, without further notice, to remove, at the Contractor's expense, any material, equipment and/or trailers which the Owner deems are in violation of this Paragraph.

4.17 CUTTING AND PATCHING OF WORK

4.17.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work or to make its several parts fit together properly and in accordance with the Contract Documents.

4.17.2 The Contractor shall not damage or endanger any portion of the Work or the work of the Owner or any Separate Contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any Separate Contractor except with the written consent of the Owner and of such Separate Contractor. The Contractor shall not unreasonably withhold from the Owner or any Separate Contractor his consent to cutting or otherwise altering the Work. The Owner shall not be required to accept work with a cut, splice, or patch when such cut, splice or patch is not generally accepted practice for the particular work involved or is otherwise unworkmanlike in the opinion of the Design Consultant or the Owner.

4.17.3 Existing structures and facilities including but not limited to building, utilities, topography, streets, curbs, walks, etc., that are damaged or removed due to required excavations or other construction work, shall be patched, repaired or replaced by the Contractor to satisfaction of the Design Consultant and the Owner of such structures and facilities and authorities having jurisdiction. In event the local jurisdictional authorities require that such repairing and patching be done with their own labor and materials, the Contractor shall abide by such regulations and pay for such work with no increase in the Contract Sum.

4.18 CLEANING UP

4.18.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work and before final payment is made, he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials.

4.18.2 If the Contractor fails to clean up during or at the completion of the Work, the Owner may do so as provided in Section 6.3 and the cost thereof shall be charged to the Contractor.

4.19 COMMUNICATIONS

4.19.1 All communications from the Contractor relating to the Contract Documents or the construction schedule will be directed to the Design Consultant and copied to the Owner. Similarly, all correspondence from the Owner or Design Consultant will be directed to the Contractor and copied to the Owner or Design Consultant.

4.20 ROYALTIES AND PATENTS

4.20.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights arising out of the Work and shall save the Owner harmless from loss on account thereof.

4.21 INDEMNIFICATION

4.21.1 To the fullest extent permitted by law, the Contractor shall, at its sole cost and expense, indemnify, defend, and hold harmless the Owner and its agents, representatives, and employees from and against all claims, actions, judgments, costs, liabilities, penalties, damages, losses and expenses, including but not limited to attorneys' fees, arising out of and/or resulting from the performance of the Work, provided that any such claim, action, judgment, cost, liability, penalty, damage, loss or expense is caused by any negligent act, error or omission of the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be legally liable. The above obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Section 4.21.1. The parties agree that this indemnification clause is an "evidence of indebtedness" for purpose of N.C. Gen. Stat. § 6-21.2. The parties also specifically acknowledge that the Owner is a public body and it is the intent of the parties that the Owner not incur any expenses when the Contractor is solely responsible for the claims.

4.21.2 In any and all claims against the Owner or the Design Consultant or any of their agents, representatives, or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be

liable, the indemnification obligation under this Section 4.21 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

4.21.3 No provision of this Section 4.21 shall give rise to any duties on the part of the Design Consultant or the Owner, or any of their agents, representatives, or employees.

4.22 PERSONS AUTHORIZED TO SIGN DOCUMENTS

4.22.1 The Contractor, within five (5) days after the earlier of the date of a Notice to Proceed or the date of the Owner-Contractor Agreement, shall file with the Owner a list of all persons who are authorized to sign documents such as contracts, certificates, and affidavits on behalf of the Contractor and to fully bind the Contractor to all the conditions and provisions of such documents, except that in the case of a corporation he shall file with the Owner a certified copy of a resolution of the Board of Directors of the corporation in which are listed the names and titles of corporation personnel who are authorized to sign documents on behalf of the corporation and to fully bind the corporation to all the conditions and provisions of such documents.

4.23 CONDITIONS AFFECTING THE WORK

4.23.1 The Contractor shall be responsible for taking all steps necessary to ascertain the nature and location of the Work and the general and local conditions that can affect the Work or the cost thereof. Failure by the Contractor to fully acquaint himself with conditions which may affect the Work, including, but not limited to conditions relating to transportation, handling, storage of materials, availability of labor, water, roads, weather, topographic and subsurface conditions, Multi-Prime Contract conditions, applicable provisions of law, and the character and availability of equipment and facilities needed prior to and during the execution of the Work, shall not relieve the Contractor of his responsibilities under the Contract Documents and shall not constitute a basis for an adjustment in the Contract Sum or the Contract Time under any circumstances. The Owner assumes no responsibility for any understanding or representation about conditions affecting the Work made by any of his officers, employees, representatives, or agents prior to the execution of the Contract, unless such understandings or representations are expressly stated in the Contract Documents.

4.23.2 If in the execution of the Work any valuable items or materials of any kind are discovered buried or hidden within the Work, such items or materials shall be the property of the Owner. The Contractor shall take reasonable precautions to prevent any persons from removing or damaging such items or materials and shall immediately upon discovery thereof and before removal, acquaint the Owner or the Design Consultant with such discovery and carry out, at the expense of the Owner, the Owner's or the Design Consultant's orders as to disposal of the same.

4.24 COMPLIANCE WITH BOARD POLICIES AND PROCEDURES

The Contractor acknowledges that Board policies are available for review at the Owner's website and agrees to comply with the policies. The Contractor also agrees to comply with the following provisions:

4.24.1 The Contractor, its Subcontractors and employees shall not possess or carry, whether openly or concealed, any gun, rifle, pistol, or explosive on any property owned by the Owner. This

- includes firearms locked in containers, vehicles or firearm racks within vehicles. The Contractor, its Subcontractors and employees shall not cause, encourage or aid a minor, who is less than 18 years old to possess or carry, whether openly or concealed, any weapons on any property owned by the Owner.
- 4.24.2 The Contractor, its Subcontractors and employees, are prohibited from profane, lewd, obscene or offensive conduct or language, including engaging in sexual harassment.
- 4.24.3 The Contractor and its Subcontractors shall not manufacture, transmit, conspire to transmit, possess, use or be under the influence of any alcoholic or other intoxicating beverage, narcotic drug, hallucinogenic drug, amphetamine, barbiturate, marijuana or anabolic steroids, or possess, use, transmit or conspire to transmit drug paraphernalia on any property owned by the Owner.
- 4.24.4 The Contractor and its Subcontractors may not at any time use or display tobacco or nicotine-containing products, including but not limited to electronic cigarettes (e-cigarettes), on school premises, both indoor and outdoor. The prohibition of the display of tobacco or nicotine products shall not extend to a display that has a legitimate instructional or pedagogical purpose. For purposes of this Contract, “tobacco product” is defined to include cigarettes, cigars, blunts, bidis, pipes, chewing tobacco, snuff, and any other items containing or reasonably resembling tobacco, tobacco products, or any facsimile thereof. “Tobacco use” includes smoking, chewing, dipping, or any other use of tobacco products.
- 4.24.5 The Contractor, its Subcontractors and employees shall not solicit from or sell to students or staff within the Owner’s facilities or campuses, and shall not give gifts of any value to school system employees.
- 4.24.6 Operators of all commercial vehicles on any property owned by the Owner shall be subject to post-accident, random, reasonable suspicion and follow-up testing for drugs and alcohol.
- 4.24.7 The Contractor, its Subcontractors and employees are prohibited from using access to the site pursuant to this Agreement as a means to date, court, or enter into a romantic or sexual relationship with any student enrolled in the Owner’s schools. The Contractor agrees to indemnify the Owner for claims against the Owner resulting from relationships which have occurred or may occur between a student and an employee of the Contractor or Subcontractor.
- 4.24.8 Lunsford Act/Criminal Background Checks. The Contractor shall conduct at its own expense sexual offender registry checks on each of its owners, employees, agents, or Subcontractors (“contractual personnel”) who will engage in any service on or delivery of goods to school system property or at a school-system sponsored event, except checks shall not be required for individuals who are solely delivering or picking up equipment, materials, or supplies at: (1) the administrative office or loading dock of a school; (2) non-school sites; (3) schools closed for renovation; or (4) school construction sites.. The checks shall include at a minimum checks of the State Sex Offender and Public Protection Registration Program, the State Sexually Violent Predator Registration Program, and the National Sex Offender Registry (“the Registries”). For the Contractor’s convenience only, all of the required registry checks may be completed at no cost by accessing the United States Department of Justice Sex Offender Public Website at [http:// www.nsopw.gov/](http://www.nsopw.gov/). The Contractor shall provide certification that the registry checks were conducted on each of its contractual personnel providing services or delivering goods under this Agreement prior to the commencement of such services or the delivery of such

- goods. The Contractor shall conduct a current initial check of the registries (a check done more than 30 days prior to the date of this Agreement shall not satisfy this contractual obligation). In addition, Contractor agrees to conduct the registry checks and provide a supplemental certification before any additional contractual personnel are used to deliver goods or provide services pursuant to this Agreement. Contractor further agrees to conduct annual registry checks of all contractual personnel and provide annual certifications at each anniversary date of this Agreement. Contractor shall not assign any individual to deliver goods or provide services pursuant to this Agreement if said individual appears on any of the listed registries. Contractor agrees that it will maintain all records and documents necessary to demonstrate that it has conducted a thorough check of the registries as to each contractual personnel, and agrees to provide such records and documents to the school system upon request. Contractor specifically acknowledges that the school system retains the right to audit these records to ensure compliance with this Section at any time in the school system's sole discretion. Failure to comply with the terms of this provision shall be grounds for immediate termination of the Agreement. In addition, the Owner may conduct additional criminal records checks at the Owner's expense. If the school system exercises this right to conduct additional criminal records checks, Contractor agrees to provide within seven (7) days of request the full name, date of birth, state of residency for the past ten years, and any additional information requested by the school system for all contractual personnel who may deliver goods or perform services under this Agreement. Contractor further agrees that it has an ongoing obligation to provide the school system with the name of any new contractual personnel who may deliver goods or provide services under the Agreement. The Owner reserves the right to prohibit any contractual personnel of Contractor from delivering goods or providing services under this Agreement if the Owner determines, in its sole discretion, that such contractual personnel may pose a threat to the safety or well-being of students, school personnel or others.
- 4.24.9 Contractor shall not employ any individuals to provide services to the Owner who are not authorized by federal law to work in the United States. Contractor represents and warrants that it is aware of and in compliance with the Immigration Reform and Control Act and North Carolina law (Article 2 of Chapter 64 of the North Carolina General Statutes) requiring use of the E-Verify system for employers who employ twenty-five (25) or more employees and that it is and will remain in compliance with these laws at all times while providing services pursuant to this Agreement. Contractor shall also ensure that any of its Subcontractors (of any tier) will remain in compliance with these laws at all times while providing subcontracted services in connection with this Agreement. Contractor is responsible for providing affordable health care coverage to all of its full-time employees providing services to the School System. The definitions of "affordable coverage" and "full-time employee" are governed by the Affordable Care Act and accompanying IRS and Treasury Department regulations.
- 4.24.10 The Contractor, its Subcontractors and employees shall not interact with any students. Nothing in Paragraph 4.24 shall be construed to prevent the Contractor, its Subcontractors and employees from taking necessary measures to protect students, staff or other employees.
- 4.24.11 The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ any unfit person or anyone not skilled in the task assigned to it. The Owner may require the Contractor to remove any employee the Owner deems incompetent, careless or otherwise objectionable.
- 4.24.12 All agents and workers of the Contractor and its Subcontractors shall wear identification badges provided by the Contractor at all times they are on the Owner's property. The identification badges shall at a minimum display the company name, telephone number, employee name and

- a picture of the employee.
- 4.24.13 The Contractor shall comply with the Owner's site or school building access procedures when working on any existing school campus.
- 4.24.14 Anti-Nepotism. Unless disclosed to the Owner in writing prior to the Board's approval and execution of the Agreement, the Contractor warrants that, to the best of its knowledge and in the exercise of due diligence, none of its corporate officers, directors, or trustees and none of its employees who will directly provide services under this Agreement are immediate family members of any member of the Owner's Board of Education or of any principal or central office staff administrator employed by the Owner. For purposes of this provision, "immediate family" means spouse, parent, child, brother, sister, grandparent, or grandchild, and includes step, half, and in-law relationships. Should Contractor become aware of any family relationship covered by this provision or should such a family relationship arise at any time during the term of this Agreement, Contractor shall immediately disclose the family relationship in writing to the Superintendent. Unless disclosed prior to the execution of the Agreement or formally waived by the Owner at a Board meeting, the existence of a family relationship covered by this Agreement is grounds for immediate termination by Owner without further financial liability to Contractor.
- 4.24.15 Restricted Companies Lists. Contractor represents that as of the date of this Agreement, Contractor is not included on the Final Divestment List created by the North Carolina State Treasurer pursuant to N.C. Gen. Stat. § 147-86.58. Contractor also represents that as of the date of this Agreement, Contractor is not included on the list of restricted companies determined to be engaged in a boycott of Israel created by the North Carolina State Treasurer pursuant to N.C. Gen. Stat. § 147-86.81.

ARTICLE 5

SUBCONTRACTORS

- 5.1 DEFINITION
- 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the site. The term Subcontractor may be referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative. The term Subcontractor does not include any Separate Contractor or his subcontractors.
- 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site or who contracts to perform or supply any of the Work under the scope of a Subcontractor's subcontract. The term Sub-subcontractor may be referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.
- 5.1.3 Nothing contained in the Contract Documents is intended to, nor shall it create, any contractual relationship between the Owner, the Design Consultant, or any of their agents, consultants, employees, independent contractors, or representatives and any Subcontractor, Sub-subcontractor, Supplier or Vendor of the Contractor, except the relationship between Owner and Contractor, but the Owner shall be entitled to performance of all obligations intended for his benefit, and to enforcement thereof.

- 5.1.4 The Owner and Design Consultant will not deal directly with any Subcontractor, Sub-subcontractor or Material Supplier. Communication will be made only through the Contractor. Subcontractor, Sub-subcontractors or Material Suppliers shall route requests for information or clarification through the Contractor to the Design Consultant.
- 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK
- 5.2.1 The Contractor, in compliance with the requirements of the Contract Documents and within ten (10) days after the Notice to Proceed, shall furnish in writing to the Owner the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Owner will promptly reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner to reply within a reasonable time shall constitute notice of no reasonable objection. The Contractor understands and agrees that no contractual agreement exists for any part of the Work under this Contract between the Owner and any of the Contractor's Subcontractors or Sub-subcontractors. Further, the Contractor understands and agrees that he alone is responsible to the Owner for the Work under this Contract and that any review of Subcontractors or Sub-subcontractors by the Owner will not in any way make the Owner responsible to any Subcontractor, nor responsible for the actions or failures of any Subcontractor or Sub-subcontractor.
- 5.2.1.1 The Contractor shall identify in the list of names of the Subcontractors proposed, those Subcontractors that are minority or Historically Underutilized Businesses (HUBs) and indicate the portion of the Work that each Subcontractor will perform.
- 5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner has made reasonable objection under the provisions of Paragraph 5.2.1. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.
- 5.2.3 If the Owner has reasonable objection to any proposed person or entity under Paragraph 5.2.1, the Contractor shall name a substitute to whom the Owner has no reasonable objection. The Contract Sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued, subject to an audit of said difference by the Owner; provided, however, that no increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting names as required by Paragraph 5.2.1 and the original proposed Subcontractor was: (i) able to carry out his work under his proposed subcontract, (ii) able to comply with all applicable laws, (iii) was an ongoing business in the field of his proposed subcontract, and (iv) had a labor force, capital and a means of supply compatible with the scope of his proposed subcontract.
- 5.2.4 If the Owner requires a change of any proposed Subcontractor or person or organization previously accepted by him on the Project, the Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued, subject to an audit by Owner.
- 5.2.5 The Contractor shall notify the Owner and the Design Consultant of any substitution for any Subcontractor identified in accordance with Subparagraph 5.2.1.1. The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Owner or the

Design Consultant makes reasonable objection to such substitution. Also, Contractor may make no substitution of Subcontractors in violation of applicable law.

- 5.2.6 If during the duration of the Project, the Contractor effects a substitution for any Subcontractor per Paragraph 5.2.5, or if additional subcontract opportunities become available, the Contractor shall make a good faith effort to utilize minority and Historically Underutilized Businesses (HUBs).

5.3 SUBCONTRACTUAL RELATIONS

- 5.3.1 By an 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 the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Contract Documents, assumes toward the Owner. Said agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the agreement between the Contractor and Subcontractor, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Section 5.3, and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Contract Documents available to his Sub-subcontractors.
- 5.3.2 The provisions herein regarding Subcontractor approvals shall in no way affect the liability of the Contractor to the Owner regarding performance of all obligations by or payment of Subcontractors. Approval to subcontract with any given Subcontractor shall not to any degree relieve the Contractor of his obligation to perform or have performed to the full satisfaction of the Owner the Work required by this Contract.
- 5.3.3 The Contractor shall submit Notice to the Owner of any Claims by Subcontractors for which the Owner is believed to be responsible, in strict conformance with the same time requirements and other procedures established for the submission of the Contractor's Claims to the Owner.
- ### 5.4 QUALIFICATION SUBMITTALS
- 5.4.1 Specific qualification submittals may be required of Subcontractors, installers and suppliers for certain critical items of the Work. Required qualification submittals are set forth in detail in the Specifications and shall be collected and submitted by the Contractor for review and approval by the Design Consultant. All information required of a single Subcontractor, installer or supplier shall be contained in a single, complete submittal. The Contractor shall submit the required qualification information within ten (10) days after receipt of the Design Consultant's request.
- 5.4.2 The Owner and Design Consultant shall reject any proposed Subcontractor, installer or supplier, or any qualification submittals related thereto, for the following reasons:
- .1 The Contractor's failure to submit requested information within the specified time; or

- .2 The Contractor's failure to provide all of the requested information; or
 - .3 The Contractor's submission of a Subcontractor, installer or supplier, or qualifications thereof, which are unacceptable in the judgment of the Owner or Design Consultant.
- 5.4.3 Should the Owner or Design Consultant have reasonable objection to any proposed Subcontractor, installer or supplier, the Contractor shall submit another person or firm who are reasonably acceptable to the Owner and Design Consultant.
- 5.5 PREPARATORY WORK
- 5.5.1 Before starting a portion of the Work, the Contractor and the responsible Subcontractor shall carefully examine all preparatory work that has been executed to receive his work. The Subcontractor shall check carefully, by whatever means are required, to ensure that his work and adjacent related work will finish to proper contours, planes and levels. He shall promptly notify the Contractor and the Design Consultant of any defects or imperfections in preparatory work, which will, in any way, affect satisfactory completion of his work. Absence of such notification will be construed as an acceptance of preparatory work and later Claims of defects therein will not be recognized.
- 5.5.2 Under no conditions shall a portion of the Work proceed prior to preparatory work having been completed, cured, dried, and otherwise made satisfactory to receive such related work. Responsibility for timely installation of all materials rests solely with the Contractor, who shall maintain coordination control at all times.

ARTICLE 6

WORK BY OWNER OR BY SEPARATE CONTRACTORS

- 6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS
- 6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar conditions of the Contract.
- 6.1.2 When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.
- 6.2 MUTUAL RESPONSIBILITY
- 6.2.1 The Contractor shall afford Separate Contractors and the Owner reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work and shall properly connect and coordinate the Work with that of the Owner and other contractors to store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the Work as will not unduly or unreasonably interfere with the progress of the Work or the work of any other contractors.
- 6.2.1.1 If the execution or result of any part of the Work depends upon any work of the Owner or of any Separate Contractor, the Contractor shall, prior to proceeding with the Work, inspect and promptly report to the Owner in writing any apparent discrepancies or defects in such work of

- the Owner or of any Separate Contractor that render it unsuitable for such proper execution or result of any part of the Work.
- 6.2.1.2 Failure of the Contractor to so inspect and report shall constitute an acceptance of the Owner's or Separate Contractor's work as fit and proper to receive the Work, except as to defects which may develop in the Owner's or Separate Contractor's work after completion of the Work and which the Contractor could not have discovered by its inspection prior to completion of the Work.
- 6.2.2 Should the Contractor cause damage to the Work or property of the Owner or of any Separate Contractor on the Project, or to other work on the site, or delay or interfere with the Owner's work on ongoing operations or facilities or adjacent facilities or said Separate Contractor's work, the Contractor shall be liable for the same; and, in the case of another contractor, the Contractor shall attempt to settle said Claim with such other contractor prior to such other contractor's institution of litigation or other proceedings against the other contractor.
- 6.2.2.1 Should a Separate Contractor be declared in default by the Owner, the Owner shall not be obligated to hire a contractor to perform the work of the Separate Contractor during the time the Separate Contractor's surety is remedying the default pursuant to Paragraph 3.4.2.
- 6.2.2.2 If such Separate Contractor sues the Owner or Design Consultant on account of any damage, delay or interference cause or alleged to have been caused by the Contractor, the Owner shall notify the Contractor, who shall defend the Owner and Design Consultant in such proceedings at the Contractor's expense. If any judgment or award is entered against the Owner or Design Consultant in such proceedings, the Contractor shall satisfy the same and shall reimburse the Owner and Design Consultant for all damages, expenses, attorney's fees and other costs which the Owner or Design Consultant incurs as a result thereof.
- 6.2.3 Should a Separate Contractor cause damage to the Work or to the property of the Contractor or cause delay or interference with the Contractor's performance of the Work, the Contractor shall present directly to said Separate Contractor any Claims it may have as a result of such damage, delay or interference (with an information copied to the Owner) and shall attempt to settle its Claim against said Separate Contractor prior to the institution of litigation or other proceedings against said Separate Contractor.
- 6.2.3.1 In no event shall the Contractor seek to recover from the Owner or the Design Consultant, and the Contractor hereby waives any Claims against the Owner and Design Consultant relating to any costs, expenses (including, but not limited to, attorney's fees) or damages or other losses incurred by the Contractor as a result of any damage to the Work or property of the Contractor or any delay or interference caused by any Separate Contractor.
- 6.2.4 Whenever Contractor receives items from another contractor or from Owner for storage, erection or installation, the Contractor receiving such items shall give receipt for items delivered, and thereafter will be held responsible for care, storage and any necessary replacing of item or items received.
- 6.2.5 When certain items of equipment and other work are indicated as "NIC" (not in contract), or to be furnished and installed under other contracts, any requirements set forth in the Contract Documents for preparation of openings, provision of backing, etc., for receipt of such "NIC" work will be furnished upon written request of the Contractor who shall properly form and otherwise prepare his work in a satisfactory manner to receive such "NIC" work.

6.3 OWNER'S RIGHT TO PERFORM DISPUTED WORK

6.3.1 If a dispute arises between the Contractor and Separate Contractors as to their responsibility for cleaning up as required by Section 4.18 or for accomplishing coordination or doing required cutting, filling, excavating or patching as required by Section 4.17, the Owner may carry out such work and charge the cost thereof to the responsible party as the Owner shall determine to be just.

6.4 COORDINATION OF THE WORK

6.4.1 By entering into this Contract, Contractor acknowledges that there may be other contractors on the site whose work will be coordinated with that of his own. Contractor expresses, warrants and guarantees that he will cooperate with other contractors and will do nothing to delay, hinder or interfere with the work of other Separate Contractors, the Owner or Design Consultant. Contractor also expressly agrees that, in the event his work is hindered, delayed, interfered with or otherwise affected by a Separate Contractor, his sole remedy will be a direct action against the Separate Contractor as described in this Article 6. Contractor will have no remedy, and hereby expressly waives any remedy, against the Owner and/or the Design Consultant on account of delay, hindrance, interference or other event caused by a Separate Contractor.

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

7.1.1 This Contract shall be governed by the laws of the State of North Carolina.

7.1.2 Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein. If through mistake or otherwise, any such provision is not inserted or is not correctly or fully inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contractor shall not assign the Contract or sublet it as a whole without the written consent of the Owner, nor shall the Contractor assign any moneys due or to become due to him hereunder, without the previous written consent of the Owner and the Contractor's Surety.

7.3 CLAIMS AND DAMAGES

7.3.1 Should the Contractor, Subcontractor or any Sub-subcontractor suffer injury or damage to person or property because of any act or omission of the Owner or Design Consultant, or of any of their employees, agents or others for whose acts either is legally liable, the Claim on behalf of the Contractor its Subcontractors or Sub-subcontractors shall be made by giving Notice to

the Owner, as provided in Article 15 ; otherwise, the Contractor, Subcontractors and Sub-subcontractors shall have waived any and all rights he may have against the Owner or the Design Consultant, or their employees, representatives and agents. The Contractor shall indemnify, defend and hold the Owner harmless from any Claim by a Subcontractor that is waived because it is not filed in strict conformance with this Paragraph or any other provision of the Contract regarding Claims.

7.4 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.4.1 The Contractor shall furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder in a form and with a Surety satisfactory to the Owner.

7.4.2 The Contractor is required to furnish in duplicate a Performance Bond and a Labor and Material Payment Bond, each in the amount of one hundred percent (100%) of the Contract Sum, written by a surety company licensed to do business in North Carolina and with a minimum AM Best "A" rating or comparable rating from another service reasonably acceptable to Owner.

7.5 RIGHTS AND REMEDIES

7.5.1 The duties and obligations of the Contractor imposed by the Contract Documents and the rights and remedies of the Owner available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

7.5.2 Except as may be specifically agreed in writing, the failure of the Owner or the Design Consultant to insist in any one or more instances upon the strict performance of any one or more of the provisions of the Contract, or to exercise any right herein contained or provided by law, shall not be construed as a waiver or relinquishment of the performance of such provisions or right(s) or of the right to subsequently demand such strict performance or exercise such right(s), and the rights shall continue unchanged and remain in full force and effect.

7.5.3 The Contractor agrees that he can be adequately compensated by money damages for any breach of the Contract which may be committed by the Owner and hereby agrees that no default, act, or omission of the Owner or the Design Consultant, except for failure to make progress payments as required by the Contract Documents, shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the provisions of the Contract or (unless the Owner shall so consent or direct in writing) to suspend or abandon performance of all or any part of the Work. The Contractor hereby waives any and all rights and remedies to which he might otherwise be or become entitled, save only his right to money damages.

7.6 TESTS AND INSPECTIONS

7.6.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested, or approved, the Contractor shall give the Owner and Design Consultant timely Notice of its readiness so the Design Consultant and the Owner may observe such inspection, testing or approval. Unless otherwise specifically provided in the Contract Documents, the Contractor shall bear all costs of such inspections, tests or approvals, except that Owner shall pay for "special inspections" as defined and required in Section 1704, the North Carolina State Building Code, or successor section. In the event that such "special inspections" reveal a failure of the Work to comply with the Contract Documents or applicable laws, ordinances, regulations or orders of public authorities having jurisdiction, Contractor shall reimburse the Owner for the costs of such

“special inspections”.

- 7.6.1.1 Unless otherwise stipulated in the Contract Documents, the Contractor shall pay for all utilities required for testing of installed equipment of all of his work and work of each Subcontractor. Boiler fuel other than gas shall be provided by Subcontractor furnishing boilers. Labor and supervision required for making such tests shall be provided at no additional cost to the Owner.
- 7.6.2 If the Design Consultant or the Owner determines that any portion of the Work requires additional inspection, testing, or approval which Paragraph 7.6.1 does not include, the Owner will instruct the Contractor to order such additional inspection, testing or approval, and the Contractor shall give Notice as provided in Paragraph 7.6.1. If such additional inspection or testing reveals a failure of any portion of the Work to comply (1) with the requirements of the Contract Documents, or (2) with respect to the performance of the Work, with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof, including compensation for the Design Consultant's and Owner's additional construction management expenses made necessary by such failure.
- 7.6.3 With regard to inspections and tests, the costs of which the Owner is responsible for paying, they will be made by a pre-qualified, independent testing agency selected by the Owner. The cost of the initial services of such agency will be paid by the Owner. When the initial tests indicate non-compliance with the Contract Documents, any subsequent testing occasioned by non-compliance shall be performed by the same agency and the cost thereof shall be borne by the Contractor. Representatives of the testing agency shall have access to the Work at all times. The Contractor shall provide facilities for such access in order that the agency may properly perform its functions.
- 7.6.4 The independent testing agency, contracted by the Owner, shall prepare the test reports, logs, and certificates applicable to the specific inspections and tests and promptly deliver the specified number of copies to the designated parties. Certificates of inspection, testing or approval required by public authorities shall be secured by the Contractor and promptly delivered by him to the Owner, in adequate time to avoid delays in the Work or final payment therefore.
- 7.6.5 If the Design Consultant or the Owner is to observe the inspections, tests or approvals required by the Contract Documents, laws, ordinances, rules, regulations, or order of any public authority having jurisdiction or that are required to establish compliance with the Contract Documents, he will do so promptly and, where practicable, at the normal place of testing.
- 7.6.6 The Contractor shall pay for and have sole responsibility for inspections or testing performed exclusively for his own convenience.
- 7.7 UNENFORCEABILITY OF ANY PROVISION
- 7.7.1 If any provision of this Contract is held as a matter of law to be unenforceable or unconscionable, the remainder of the Contract shall be enforceable without such provision.
- 7.8 ATTORNEYS' FEES AND OTHER EXPENSES
- 7.8.1 The Contractor hereby agrees that he will not submit, assert, litigate or otherwise pursue any frivolous or unsubstantiated Claims or Claims he has specifically waived under the terms of the Contract Documents. In the event that the Contractor's or its Subcontractor's or Sub-subcontractor's Claims, or any separate item of a Claim, is without substantial justification, the Contractor shall reimburse the Owner or Design Consultant for all costs and expenses associated

with defending such Claim or separate item, including but not limited to, attorneys' fees, audit costs, accountants' fees, expert witness' fees, additional Design Consultant expenses, additional construction management expenses, or services and any other consultant costs.

7.8.2 If the Contractor breaches any obligation under the Contract Documents, the Contractor shall reimburse the Owner and Design Consultant for all costs and expenses incurred by the Owner relating to such breach, including but not limited to attorneys' fees, audit costs, accountants' fees, expert witness' fees, additional Design Consultant expenses, additional construction management expenses, and any other consultant costs.

7.8.3 If the Owner or Design Consultant substantially prevails in a Claim brought against the Contractor, or in defending a Claim brought by the Contractor, including but not limited to, Claims for fraud or misrepresentation, overpayment, defective work, delay damages, and recovery of termination expenses, the Contractor shall reimburse the Owner and/or Design Consultant for all costs and expenses incurred by them relating to such Claim, including but not limited to attorneys' fees, audit costs, accountants' fees, expert witness' fees, additional Design Consultant expenses, additional construction management expenses, and any other consultant costs.

ARTICLE 8

TIME

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Final Completion of the Work as defined in Paragraph 8.1.4, including authorized adjustments thereto. The Contractor shall achieve Final Completion within the Contract Time.

8.1.2 The date of commencement of the Work is the date established in the Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein. The Contractor shall not commence work or store materials or equipment on site until written Notice to Proceed is issued or until the Contractor otherwise receives the Owner's written consent.

8.1.3 The date of Substantial Completion of the Work or designated portion thereof is the date certified by the Design Consultant and the Owner when the Work or a designated portion thereof is sufficiently complete, in accordance with the Contract Documents, so the Owner can fully and legally occupy and utilize the Work or designated portion thereof for the use for which it is intended, with all of the parts and systems operable as required by the Contract Documents, including a preliminary test and balance report for the mechanical system. Only incidental corrective work and any final cleaning beyond that needed for the Owner's full use may remain for Final Completion. The Contractor acknowledges and agrees that the intercom, telephone, data security, building automation system (including functional graphics at the site), MATV, and other educational operational systems are required for the Owner's use of the building for its intended purpose. The Contractor shall provide operation and maintenance manuals to the Owner as required by the Contract Documents prior to Substantial Completion and shall provide the required training on the operation of the equipment and systems within two weeks of Substantial Completion. The Contractor shall achieve Substantial Completion by the date specified in the Supplemental Conditions including authorized adjustments thereto. The Owner's occupancy of incomplete work shall not alter the Contractor's responsibilities pursuant

to this paragraph. Only incidental corrective work and any final cleaning beyond that needed for the Owner's full use may remain for Final Completion. The issuance of a temporary or final certificate of occupancy shall not, in itself, constitute Substantial Completion.

8.1.4 Final Completion of the Work occurs on the date certified by the Design Consultant and the Owner when the Work is totally complete, to include punch list work, in accordance with the Contract Documents and the Owner may fully occupy and utilize the Work for the use for which it is intended. The issuance of a temporary or final certificate of occupancy shall not, in itself, constitute Final Completion.

8.1.5 The term Day as used in the Contract Documents shall mean calendar day unless otherwise specifically designated. All dates shall mean midnight of the indicated day unless otherwise stipulated.

8.1.6 Completion Dates shall mean the dates set forth in the Supplemental Conditions for Substantial Completion and Final Completion.

8.2 PROGRESS AND COMPLETION

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract with respect to the Contractor's performance.

8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Paragraph 8.1.2. He shall carry the Work forward expeditiously with adequate forces and shall achieve Substantial Completion and Final Completion within the time frames stated in the Contract Documents.

8.2.3 Attention is directed to the fact that the Work is urgently needed by the Owner; for this reason, it shall be agreed that the Contractor and its Subcontractors will achieve Substantial Completion of the Work under the Contract within the time established under Paragraph 8.2.4 of the Supplemental Conditions after award of Contract, or Notice to Proceed, and that he will achieve Final Completion of the Work in all its details for final acceptance within the time established under Paragraph 8.2.4 of the Supplemental Conditions.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 The time during which the Contractor or any of the Subcontractors is delayed in the performance of the Work by the issuance of any required permits, acts of god, excessive inclement weather, fires, floods, epidemics, quarantine restrictions, strikes, riots, civil commotions or freight embargoes, or other conditions beyond the Contractor's or the Subcontractors' control and which the Contractor or the Subcontractors could not reasonably have foreseen and provided against, except for delays caused solely by the Owner, Design Consultant or their consultants, shall be added to the time for completion of the Work stated in the Contract. Neither the Owner nor the Design Consultant shall be obligated or liable to the Contractor or the Subcontractors for indirect or direct damages, costs or expenses of any nature which the Contractor, the Subcontractors, or any other person may incur as a result of any of the delays, interferences, changes in sequence in the Work included in this Section 8.3.1. The Contractor hereby expressly waives any Claims against the Owner and the Design Consultant on account of any indirect or direct damages, lost profits, costs or expenses of any nature which the Contractor, the Subcontractors or any other person may incur as a result of any delays, interferences, changes in sequence or the like, and it is understood and agreed that the Contractor's sole and exclusive

remedy in any such events shall be an extension of the Contract time in accordance with the Contract Documents.

- 8.3.2 In the event Project delays arise from or out of any act or omission of the Owner, Design Consultant or their consultants, the time during which the Project is delayed shall be added to the Contract and the Contractor may be reimbursed for its direct Project damages, excluding general overhead expenses and indirect costs, if the Contractor strictly complies with this Article 8.3. Notwithstanding the previous sentence, if the Contractor or Subcontractor in any way shares in responsibility for the delay, neither the Owner nor the Design Consultant shall be obligated or liable to the Contractor or the Subcontractors for indirect or direct damages, costs or expenses of any nature which the Contractor, the Subcontractors, or any other person may incur as a result of any of the delays, interferences, changes in sequence of the Work, and the Contractor's sole remedy, if any, shall be an extension of the Contract time.
- 8.3.3 In the event Project delays arise solely from or out of any act or omission of the Contractor, Subcontractors or their agents, the Contractor shall not be entitled to extension of the Contract time and shall be subject to the payment of Liquidated Damages as provided in this Contract.
- 8.3.4 The Contract time shall be adjusted only for changes pursuant to section 12.1, suspension of the Work pursuant to paragraph 3.3.2 or paragraph 3.3.3, and excusable delays pursuant to paragraph 8.3.4. In the event the Contractor requests an extension of the Contract time or files a Claim related to any form of delay, it shall furnish such justification and supporting evidence as the Owner may deem necessary for a determination of whether or not the Contractor is entitled to an extension of time under the provisions of the Contract, and shall further conform to all of the requirements of the specifications and the Contract regarding construction schedules and reports. The burden of proof to substantiate a Claim shall rest with the Contractor, including evidence that the cause was beyond its control. The Owner shall base its findings of fact and decision on such justification and supporting evidence, including a finding that the alleged delay impacted the Project's critical path, and shall advise the Contractor in writing thereof. If the Owner finds that the Contractor is entitled to any extension of the Contract time, the Owner's determination of the total number of days of extension shall be based upon the currently approved progress schedule and on all data relevant to the extension. Such data will be incorporated into the schedule in the form of a revision thereto, accomplished in a timely manner. The Contractor acknowledges and agrees that actual delays (due to said changes, suspension of Work or excusable delays) in activities which, according to the schedule, do not affect the Contract time, do not have any effect upon the Contract time and therefore will not be the basis for a change therein. The Contractor acknowledges and agrees that time extensions will be granted only to the extent that excusable delays exceed the available float in the critical path activities in the Contractor's currently approved schedule.
- 8.3.4.1 Extensions in the Contract time by Change Orders are subject to extension-in-time audit by the Owner as follows:
- 8.3.4.1.1 The Contractor agrees that, even though the Owner, Contractor and Design Consultant have previously signed a Change Order containing an extension-in-time resulting from a change in or addition to the Work that said extension in the Contract time may be adjusted by an audit after the fact by the Owner. If such an audit is to be made, the Owner must undertake the audit and make a ruling within thirty (30) days after the completion of the Work under the Change Order.
- 8.3.4.1.2 The Contractor agrees that any extension of the Contract time to which it is entitled arising out of a Change Order undertaken on a force accounting (labor and materials) basis, shall be

determined by an extension-in-time audit by the Owner after the Work of the Change Order is completed. Such rulings shall be made by the Owner within thirty (30) days after a request for same is made by the Contractor or Design Consultant, except said thirty (30) days will not start until the Work under the Change Order is completed.

- 8.3.4.1.3 Should a time extension be granted for Substantial Completion the date for Final Completion shall be appropriately adjusted unless specifically stated otherwise.
- 8.3.4.2 Subject to other provisions of the Contract, the Contractor may be entitled to an extension of the Contract time (but no increase in the Contract sum) for delays arising from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, the Subcontractors or suppliers as follows:
- 8.3.4.2.1 Labor disputes and strikes (including strikes affecting transportation), that do, in fact, directly delay the progress of the Work on the critical path; however, an extension of Contract time on account of an individual labor strike shall not exceed the number of days of said strike;
- 8.3.4.2.2 Acts of nature: tornado, fire, hurricane, blizzard, earthquake, or flood that damage Work in place or stored materials or adversely impact the schedule's critical path;
- 8.3.4.2.3 Excessive inclement weather; however, the Contract time will not be extended due to reasonably anticipated inclement weather or for delays in the aftermath of inclement weather, reasonably anticipated or excessive. The time for performance of this Contract, as stated in the Contract Documents, includes an allowance for calendar days which may not be available for construction out-of-doors; for the purposes of this Contract, the Contractor agrees that the number of calendar days per month based on a five-year average shall be considered reasonably anticipated inclement weather and planned for in the construction schedule and the Contract Documents. Unless the Contractor can substantiate to the satisfaction of the Owner that there was greater than the reasonably anticipated inclement weather considering the total cumulative time from the notice-to-proceed until the date established for Substantial Completion using data from the national weather service station identified in the Supplemental Conditions, or a weather station acceptable to the Owner and that such alleged greater than reasonably anticipated inclement weather actually delayed the Work or portions thereof which had an effect upon the Contract time, the Contractor shall not be entitled to an extension of time.

Also the Contractor agrees that the calculation of the number of excessive inclement weather days shall be the number of days in excess of the five-year average for each month, in which precipitation exceeded one tenth (.10) inch, or in which the highest temperature was 32 degrees F or less as recorded at the approved weather station. Rain days from hurricanes and tropical storms not causing damage in the county in which the project is located shall be deemed inclement weather days.

If the total accumulated number of calendar days lost to excessive inclement weather, from the notice-to-proceed until the date established for Substantial Completion, exceeds the total accumulated number to be reasonably anticipated for the same period based upon the five-year average, time for completion will be extended by the number of calendar days needed to include the excess number of calendar days lost. No extension of time will be made for days due to excessive inclement weather occurring after the date established for Substantial Completion or for work out of doors that is not on the critical path. No change in Contract sum will be authorized because of adjustment of Contract time due to excessive inclement weather; and

- 8.3.4.2.4 Delays in the issuance of the building permit required for construction of the Project, acts of the public enemy, acts of the State, Federal or local government in its sovereign capacity, and acts of another Contractor in the performance of a Contract with the Owner relating to the Project.
- 8.3.5 If the Contractor shall neglect, fail or refuse to complete the Work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay the Owner the amount specified in the Contract, not as a penalty but as Liquidated Damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the Work. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.
- 8.3.6 The Contractor and the Subcontractors shall not be entitled to and hereby expressly waive any extension of time resulting from any condition or cause unless said Claim for extensions of time is made in writing to the Owner within ten (10) days of the first instance of delay for all delays, except excessive inclement weather which shall be made in writing to the Owner within forty-five (45) days after the date established for Substantial Completion. Circumstances and activities leading to such Claim shall be indicated or referenced in a daily field inspection report for the day(s) affected. In every such written Claim, the Contractor shall provide the following information:
- 8.3.6.1 Nature of the delay;
- 8.3.6.2 Date (or anticipated date) of commencement of delay;
- 8.3.6.3 Activities on the progress schedule affected by the delay, and/or new activities created by the delay and their relationship with existing activities;
- 8.3.6.4 Identification of person(s) or organization(s) or event(s) responsible for the delay;
- 8.3.6.5 Anticipated extent of the delay; and
- 8.3.6.6 Recommended action to avoid or minimize the delay.
- 8.3.7 If no schedule or agreement is made stating the dates upon which written interpretations as set forth in Section 2.2 shall be furnished, then no Claim for delay shall be allowed on account of failure to furnish such interpretations until twenty (20) days after request is made for them, and not then unless such Claim is reasonable.
- 8.3.8 No Claim by the Contractor for an extension of time for delays will be considered unless made in strict compliance with the requirements of this Article. All Claims not filed in accordance with this paragraph shall be waived by the Contractor.
- 8.4 RESPONSIBILITY FOR COMPLETION
- 8.4.1 The Contractor shall be responsible for completion in accordance with Paragraph 4.12.1.
- 8.4.2 The Owner may require the Contractor to submit a recovery schedule demonstrating his program

and proposed plan to make up the lag in scheduled progress and to ensure completion of the Work within the Contract Time if the Project is behind schedule by four (4) or more days. If the Owner finds the proposed plan not acceptable, he may require the Contractor to submit a new plan. If the actions taken by the Contractor or the second plan proposed are not satisfactory, the Owner may require the Contractor to take any of the actions set forth in Paragraph 4.12.2 without additional cost to the Owner, to make up the lag in scheduled progress.

8.4.3 Failure of the Contractor to substantially comply with the requirements of this Section 8.4 may be considered grounds for a determination by the Owner, pursuant to Section 14.3, that the Contractor is failing to prosecute the Work with sufficient diligence to ensure its completion within the Contract Time.

8.5 LIQUIDATED DAMAGES FOR DELAY

8.5.1 Owner and Contractor agree that the damages incurred by the Owner due to the Contractor's failure to achieve Substantial Completion by the date specified in the Supplemental Conditions for Substantial Completion, including any extensions thereof, shall be in the amounts set forth in the Supplemental Conditions, for each consecutive day beyond the date of Substantial Completion that Contractor achieves Substantial Completion, and that the damages incurred by the Owner due to the Contractor's failure to achieve Final Completion by the date specified in the Supplemental Conditions for Final Completion, including any extensions thereof, shall be in the amount set forth in the Supplemental Conditions for each consecutive day beyond the date of Final Completion that Contractor achieves Final Completion. The Liquidated Damages are a reasonable estimate by Contractor and Owner of the damages to be suffered by Owner and are not to be construed as a penalty, it being recognized by the Owner and the Contractor that the injury to the Owner which could result from a failure of the Contractor to complete on schedule is uncertain and cannot be computed exactly or that it would be unreasonably expensive for Owner to calculate its damages exactly.

8.5.2 The amount specified for Substantial Completion is the minimum measure of damages the Owner will sustain due to delay in the completion of the Work, which shall include, but not be limited to the loss of use of the facilities, the relocation of students and services, the cost of the Owner's time and resources, damage to the Owner's reputation, and storage of furniture and other materials. The amount specified for Final Completion is a reasonable and proper measure of the damages the Owner will sustain due to the delay in the completion of remedial work. This amount includes the disruption to the school and the learning environment, the cost of the Owners time and resources, damage to the Owner's reputation, and the inability to fully use the facilities. The inability of the Owner to quantify actual damages shall not prevent the recovery of Liquidated Damages.

8.5.3 Notwithstanding any other provisions of these General Conditions, if there is concurrent delay in the completion of the Work, the Contractor shall be liable for Liquidated Damages as specified in the General Conditions and Supplemental Conditions during such period of concurrent delay. For the purpose of this Paragraph, concurrent delay means (a) a delay event caused in part by the Owner or its agent and in part by the Contractor or its agents, Subcontractors or Sub-subcontractors, or (b) one or more delay event caused solely by the Owner, its agents, or the Design Consultant, and one or more delay event caused in part by the Contractor, its agents, Subcontractors or Sub-subcontractors, each of which would have resulted in a delay without the other and which delays run concurrently, or at the same time. In the event that the foregoing provision making the Contractor liable for Liquidated Damages during a period of concurrent delay is found to be unenforceable, then the parties agree that in the event of a concurrent delay, the extent of the delay will be apportioned between the Owner and the

Contractor, and the Contractor will be responsible for Liquidated Damages as set forth in the General Conditions and Supplemental Conditions for those portions of the delay which are apportioned to the Contractor, its agent, Subcontractors, Sub-subcontractors, or Material Suppliers.

- 8.5.4 The provisions for Liquidated Damages do not bar or limit Owner's other rights and remedies against Contractor, for damages other than for failure to achieve the Substantial Completion date or the Final Completion date as required. The amount of Liquidated Damages set forth in Section 8.5 shall not include additional legal or design professional costs that may result from the Contractor's default. If such legal or design professional costs are incurred by the Owner, the Contractor shall be liable to the Owner for those costs in addition to the Liquidated Damages amount set forth in Section 8.5.
- 8.5.5 The Liquidated Damages assessed for failure to meet Substantial Completion by the specified date and the Liquidated Damages assessed for failure to meet Final Completion by the specified date shall be assessed cumulatively.

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

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

9.2 SCHEDULE OF VALUES

- 9.2.1 Before the first Application for Payment, the Contractor shall submit to the Owner a schedule of values allocated to the various portions of the Work and supported by such data to substantiate its accuracy as the Owner may require. This schedule, unless objected to by the Owner, shall be used as a basis for the Contractor's Applications for Payment and only for this purpose. If approved by the Owner, the Contractor may include in his schedule of values a line item for mobilization which shall include a reasonable amount of mobilization for the Contractor and his Subcontractors. The Contractor shall not front-end load his schedule of values.

9.3 APPLICATIONS FOR PAYMENT

- 9.3.1 Prior to the date for each progress payment established in the Owner-Contractor Agreement, the Contractor shall submit to the Design Consultant an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the Design Consultant and the Owner may require, including but not limited to the Contractor's certification that all work for which payment is requested has been completed in full in accordance with the Contract Documents, and reflecting retainage, if any, as provided elsewhere in the Contract Documents. If requested by the Owner, the Contractor shall also certify that he has paid all due and payable amounts for which previous Applications for Payment were issued and payments received from the Owner, by providing waivers of liens for said payments.

- 9.3.1.1 The Contractor shall submit with the Application for Payment a list of those minority and Historically Underutilized Businesses (HUBs) Subcontractors whose work is included in the application and the amount due each. In addition, the minority and Historically Underutilized

Business (HUBs) must itself perform satisfactory work or services or provide supplies under the Contract and not act as a mere conduit.

- 9.3.2 The Owner will withhold retainage from Contractor on all Applications for Payment to the maximum extent and in the maximum amount allowed by law (currently codified at N.C.G.S. 143-134.1) and in accordance with that statute or applicable successor statute. In the event that N.C.G.S 143-134.1 or applicable successor statute are not in effect or do not apply at the time the Contract is executed, Owner will retain five percent (5%) of the amount of each Application for Payment from the Contractor as retainage, until Contractor achieves Final Completion, whether or not the Owner has occupied any or all of the Project before such time. However, if the Owner, at any time after fifty percent (50%) of the Work has been completed, finds that satisfactory progress is being made, he may authorize payment to the Contractor in full of each Progress Payment for work performed beyond the fifty percent (50%) stage of completion. If a reduction in retainage has been made, the Owner may increase the retainage back to original percentage at any time if the Owner concludes that the Contractor is not progressing with the Work in a timely or satisfactory manner.
- 9.3.3 Payments may be made by the Owner, at its sole discretion, on account of materials or equipment not incorporated in the work but delivered and suitably stored at the site or in a bonded warehouse by the Contractor. Payments for materials or equipment stored shall only be considered upon submission by the Contractor of satisfactory evidence (for example, releases or paid invoices from the seller) that the Contractor has acquired title to such material, that it will be utilized on the work under this Contract and that it is satisfactorily stored, protected, and insured or that other procedures satisfactory to the Owner that will protect the Owner's interests have been taken. In the event the materials are stored in a bonded warehouse that is not located in the county of the project, the Contractor shall reimburse the travel cost and hourly billing expenses incurred by the Design Consultant for travel to view and assess whether the materials meet the requirements of the Contract Documents. Materials once paid for by the Owner become the property of the Owner and may not be removed from the work site or bonded warehouse, other than to be delivered from the warehouse to the site, without the Owner's written permission. Responsibility for such stored materials and equipment shall remain with the Contractor regardless of ownership.
- 9.3.3.1 Owner will not make payment to the Contractor on account of materials or equipment not incorporated in the Work but delivered and stored at the site if the Contractor, in his schedule of values, does not include line items for such delivered and stored materials or equipment.
- 9.3.3.2 It is specifically understood and agreed that an inspection and approval of the materials by the Owner, the Design Consultant or any agency retained by any of them shall not in any way subject the Owner to pay for the said materials or any portion thereof, even though incorporated in the Work, if said materials shall in fact turn out to be unfit to be used in the Work, nor shall such inspection be considered as any waiver of objection to the Work on account of the unsoundness or imperfection of the material used.
- 9.3.4 The Contractor warrants that title to all work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or

such other person.

9.3.5 The Contractor shall submit with the Application for Payment a notarized Contractor's Sales Tax Report of N.C. State and County sales taxes paid during the payment period with respect to building materials, supplies, fixtures, and equipment that have become a part of, or annexed to, a building or structure erected, altered or repaired for the Owner. The Sales Tax Report shall include the vendor from whom the property was purchased, the dates and number of invoices covering the purchase, the total amount of the invoices of each vendor, the North Carolina State and County sales and use tax paid thereof, and the cost of the property withdrawn from the warehouse stock and North Carolina sales or use taxes paid thereof. Items that should not be included are: scaffolding, forms for concrete, fuel for operation of machinery and equipment, tools, equipment, equipment repair parts and equipment rentals.

9.3.6 Unless an interest rate is required by law, Owner shall not pay any interest on an amount owed to Contractor. No interest shall accrue on amounts Owner is authorized by law or by the Contract to withhold or backcharge to Contractor.

9.4 CERTIFICATION OF PAYMENT

9.4.1 The Design Consultant will, after receipt of the Contractor's Application for Payment either issue a Certification of Payment to the Owner, with a copy to the Contractor, for such amount as the Design Consultant determines is properly due, or notify the Contractor in writing of their reasons for withholding a Certification as provided in Paragraph 9.6.1.

9.4.2 The submission and approval of the progress schedule and monthly updates thereof as required by the Contract Documents shall be an integral part and basic element of the application upon which progress payment shall be made. The Contractor shall be entitled to progress payments only as determined from the currently approved and updated schedule.

9.4.3 The signing of a Certification of Payment will constitute a representation by the Design Consultant to the Owner, based on their observations at the site pursuant to their agreements with the Owner, and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of their knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in their Certification); and that the Contractor is entitled to payment in the amount certified. However, by signing a Certification of Payment, the Design Consultant shall not thereby be deemed to represent that it has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that it has reviewed the construction means, methods, techniques, sequences, or procedures, or that it has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.

9.5 PROGRESS PAYMENTS

9.5.1 After a Certification of Payment has been issued, the Owner shall make payment in the manner and within the time provided in the Contract Documents, unless Contractor is in breach of the Contract or otherwise owes the Owner, in which case Owner may withhold an appropriate amount.

- 9.5.2 The Contractor shall promptly pay each Subcontractor (including suppliers, laborers, and material-men) performing labor or furnishing material or equipment for the Work, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's work. The Contractor shall, by an appropriate agreement with each Subcontractor, also require each Subcontractor to make payments to his Sub-subcontractors in similar manner. The Owner may at any time require proof of payment to a Subcontractor or Sub-subcontractor for work paid by the Owner. Notwithstanding any other provision of the General Conditions, no Contractor, Subcontractor, Sub-subcontractor or Material Supplier shall have any Claim against the Owner, by virtue of the Contract, under any theory, including breach of contract, or third party beneficiary. The Owner shall not be in privity of any contract with any Subcontractor, Sub-subcontractor or Material Supplier pertaining to the Work, the Project and these General Conditions. Also, neither the Contractor, or any Subcontractor or Sub-subcontractor shall have any right to assert a lien on Owner's real property or on any funds held by Owner.
- 9.5.3 The Owner may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Design Consultant on account of work done by such Subcontractor.
- 9.5.4 Neither the Owner nor the Design Consultant shall have any obligation to pay or to see to the payment of any moneys to any Subcontractor except as may otherwise be required by law.
- 9.5.5 No Certification for a progress payment, nor any progress payment or final payment, nor any partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.
- 9.5.6 The Contractor agrees to keep the Work and the site of the Project free and clear of all liens related to labor and materials furnished in connection with the Work. Furthermore, pursuant to and in compliance with requirements of Paragraph 9.3.4, the Contractor waives any right he may have to file any type of lien in connection with the Work. Notwithstanding anything to the contrary contained in the Contract Documents, if any such lien is filed or there is evidence to believe that any lien may be filed at any time during the progress of the Work or within the duration of this Contract, the Owner may refuse to make any payment otherwise due the Contractor or may withhold from any payment due the Contractor a sum sufficient in the opinion of the Owner to pay all obligations and expenses necessary to satisfy such lien or the underlying claim represented by such lien. The Owner may withhold such payment unless or until the Contractor, within ten (10) days after demand thereof by the Owner, shall furnish satisfactory evidence that the indebtedness and any lien in respect thereof has been satisfied, discharged and released of record, or that the Contractor has legally caused such lien to be released of record pending the resolution of any dispute between the Contractor and the person or persons filing such lien. If the Contractor shall fail to furnish such satisfactory evidence within ten (10) days of the demand thereof, the Owner may discharge such indebtedness and deduct the amount thereof, together with any and all losses, costs, damages and attorney's fees suffered or incurred by the Owner from any sum payable to the Contractor under the Contract Documents, including but not limited to final payment and retained percentage. This Paragraph 9.5.6 shall be specifically included in all Subcontracts and purchase orders entered into by the Contractor. Notwithstanding any other provision of the Contract, nothing in the Contract shall affect the rights of Subcontractors, Sub-subcontractors, Material Suppliers and Vendors from enforcing any lien rights they have against parties other than the Owner.

9.6 PAYMENTS WITHHELD

9.6.1 The Design Consultant may decline to certify payment and may withhold their Certification of Payment in whole or in part, to the extent necessary to reasonably protect the Owner, if in the Design Consultant's opinion it is unable to make representations to the Owner as provided in Paragraph 9.4.3. If the Design Consultant is unable to make representations to the Owner as provided in Paragraph 9.4.3 and to certify payment in the amount of the Application for Payment, it will notify the Contractor as provided in Paragraph 9.4.1. If the Contractor and the Design Consultant cannot agree on a revised amount, the Design Consultant will promptly issue a Certification of Payment for the amount for which it is able to make such representations to the Owner. The Design Consultant may also decline to certify payment because of subsequently discovered evidence or subsequent observations that may nullify the whole or any part of any Certification of Payment previously issued to such extent as may be necessary in its opinion to protect the Owner from loss, because of:

- .1 Defective Work not remedied,
- .2 Third party claims filed, whether in court, in arbitration or otherwise, or reasonable evidence indicating probable filing of such claims,
- .3 Failure of the Contractor to make payments properly to Subcontractors or 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 another contractor,
- .6 Reasonable evidence that Contractor will not achieve Substantial Completion and/or Final Completion by the dates specified in the Supplemental Conditions.
- .7 Failure or refusal of the Contractor to carry out the Work in accordance with or to otherwise substantially or materially comply with the Contract Documents,
- .8 Liens filed or reasonable evidence that a lien may be filed for any portion of the Work,
- .9 Failure or refusal of the Contractor to properly schedule and coordinate the Work, to provide progress schedules, reports and updates, or to provide and adhere to a recovery schedule as required by the Contract Documents,
- .10 Failure or refusal of the Contractor to fully comply with the provisions of Section 6.2 requiring the Contractor to direct certain Claims to Separate Contractors and to defend and indemnify the Owner and/or the Design Consultant in the event Separate Contractors file certain Claims,
- .11 Failure or refusal of the Contractor to submit the required information on minority and Historically Underutilized Businesses (HUBs),
- .12 Failure or refusal of the Contractor to submit a notarized North Carolina State and County

Sales Tax Report,

- .13 Any other breach of the Contract by Contractor which has or is likely to cause monetary damages or loss to Owner, or
 - .14 Any other reason authorized by the Contract Documents or by law.
- 9.6.2 When the above grounds in Paragraph 9.6.1 are removed to the Design Consultant's and Owner's satisfaction, payment shall be made for amounts withheld because of them.
- 9.7 FAILURE OF PAYMENT
- 9.7.1 If the Owner does not make payment to the Contractor within the forty-five (45) calendar days after receipt of the Contractor's approved Application for Payment from the Design Consultant through no fault of the Contractor, and the Owner otherwise not being entitled under the Contract Documents or applicable law to withhold payment, then the Contractor may, upon seven (7) additional days' Notice to the Owner, stop the Work until payment of the amount owed according to the Contract Documents has been received. In such event, the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be effected by appropriate Change Order as provided herein.
- 9.8 SUBSTANTIAL COMPLETION
- 9.8.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Paragraph 8.1.3, the Contractor shall prepare for submission to the Owner a list of items which in his opinion are to be completed or corrected and shall request in writing that the Design Consultant and the Owner perform a Substantial Completion inspection. The Design Consultant and the Owner shall review the Contractor's list and shall compile a punch list of items to be corrected and completed. The failure to include any items on such list does not alter the responsibility of the Contractor to complete the Work in accordance with the Contract Documents. When the Design Consultant and the Owner on the basis of an inspection jointly determine that the Work or designated portion thereof is substantially complete, they will then prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. 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. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.
- 9.8.2 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Design Consultant, the Owner shall make payment, except retainage held pursuant to Paragraph 9.3.2, for such work or portion thereof, as provided in the Contract Documents unless Contractor is in breach of the Contract in which case Owner may withhold an appropriate amount.
- 9.8.3 The acceptance of Substantial Completion payment shall constitute a waiver of all Claims by the Contractor and its Subcontractors and Sub-subcontractors except those previously made in writing and identified by the Contractor as unsettled at the time the Contractor submits the Application for Payment for Substantial Completion, and except for the retainage sums due at

Final Completion. The Contractor shall indemnify and hold the Owner harmless against any Claims by its Subcontractors and Sub-subcontractors that are waived because they were not made in writing and identified by the Contractor as unsettled when the Contractor submitted the Application for Payment for Substantial Completion.

- 9.8.4 The Owner shall have the option to correct or conclude any and all punch list items not completed by the Contractor to the satisfaction of the Design Consultant and the Owner within thirty (30) days from the actual date of Substantial Completion by utilizing its own forces or by hiring others. The cost of such correction of remaining punch list items by the Owner or others shall be deducted from the final payment to the Contractor. If Contractor does not complete certain punch list items within this time period, specified in Paragraph 9.8.4, all warranties and guarantees for such incomplete punch list items shall become effective upon issuance of final payment for the Project. Paragraph 9.8.4 does not limit the Liquidated Damages provisions related to failure to reach Final Completion by the date stipulated in the Contract Documents.
- 9.8.5 The issuance of the Certificate of Substantial Completion does not indicate final acceptance of the Project by the Owner, and the Contractor is not relieved of any responsibility for the Project except as specifically stated in the Certificate of Substantial Completion.
- 9.8.6 Should the Design Consultant and the Owner determine that the Work or a designated portion thereof is not substantially complete, they shall inform the Contractor in writing stating why the Project or designated portion is not substantially complete. The Contractor shall expeditiously complete the Work and shall re-request in writing that the Design Consultant and the Owner perform a Substantial Completion inspection. Costs, if any, associated with such inspection shall be assessed to the Contractor.
- 9.8.7 Certificate of Substantial Completion will not be issued until the following is completed by Contractor:
- .1 Submit Contractor's list of work not yet complete with proposed time for completion signed by Contractor's project superintendent;
 - .2 Submit Certificate of Occupancy;
 - .3 Submit record drawings, maintenance manuals, final project photos, property surveys;
 - .4 Deliver tools, spare parts, extra stock and similar items;
 - .5 Submit warranties, bonds, maintenance agreements and final certifications;
 - .6 Complete start-up testing of all systems and instruction of the Owner's personnel;
 - .7 Coordinate and complete final changeover of permanent locks and transmit keys to Owner;
 - .8 Discontinue and remove temporary facilities from the site;
 - .9 Complete final cleaning;
 - .10 Advise the Owner of pending insurance changeover requirements;
 - .11 Coordinate and complete changeover of security, telephone, cable and other services; and

- .12 Submit pay application showing 100% complete for work claimed to be substantially complete.
- 9.8.8 The Contractor acknowledges that the Design Consultant and its consultants are only required to conduct up to two (2) comprehensive substantial completion inspections as part of its basic services. If more than two (2) substantial completion inspections are required through no fault of the Design Consultant, the cost of the additional inspections shall be paid by the Contractor.
- 9.9 FINAL COMPLETION AND FINAL PAYMENT
- 9.9.1 Upon receipt of the documentation required by Section 9.8, and of written Notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Design Consultant and the Owner will promptly make such inspection and, when they find the Work acceptable under the Contract Documents and the Contract fully performed, the Design Consultant shall issue a final Certification of Payment stating that to the best of their knowledge, information and belief, and on the basis of their observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents. The final Certification of Payment will constitute that the conditions precedent to the Contractor's being entitled to final payment as set forth in Section 9.8 have been fulfilled. Payment shall be made to the Contractor in the amount certified by the Design Consultant within forty five (45) calendar days after receipt by the Owner of the final Certification of Payment except for any Work for which the Owner is entitled a credit under the Contract Documents.
- 9.9.1.1 The Contractor acknowledges that the Design Consultant and its consultants are only required to conduct up to two (2) comprehensive final completion inspections as part of its basic services. If more than two (2) final completion inspections are required through no fault of the Design Consultant, the cost of the additional inspections shall be paid by the Contractor.
- 9.9.2 Neither the final payment nor the remaining retained percentage shall become due until the Work is free and clear of any and all liens and the Contractor submits to the Owner:
- .1 An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied;
 - .2 Consent of Surety to final payment;
 - .3 If required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Owner; and
 - .4 A written certification that:
 - .1 The Contractor has reviewed the requirements of the Contract Documents,
 - .2 The Work has been inspected by the Contractor for compliance with all requirements of the Contract Documents,
 - .3 Pursuant to this inspection, the Contractor certifies and represents that the Work complies in all respects with the requirements of the Contract Documents,

- .4 The Contractor further certifies and represents that all equipment and systems have been installed in accordance with the Contract Documents and have been tested in accordance with the Specification requirements and are operational, and
 - .5 The Contractor hereby certifies and represents that the Work is complete in all respects and ready for final inspection.
- 9.9.3 If any Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify him against any loss. If any such lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien or claims, including all costs and reasonable attorney's fees. The Owner may withhold from the final payment any sum that the Owner has reason to believe may be needed to satisfy any lien, claim or threat of lien arising from the Work. The Owner may deduct from the final payment an amount equal to any costs, expenses and attorney's fees incurred by the Owner in removing or discharging any liens or claim arising from the Work.
- 9.9.4 If, after Substantial Completion of the Work, Final Completion thereof is materially delayed through no fault of the Contractor or by the issuance of Change Orders affecting Final Completion, and the Owner so confirms, the Owner shall, upon application by the Contractor and certification by the Design Consultant, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for the portion of the Work not fully completed or corrected is less than the retainage stipulated in the Contract Documents, and if bonds have been furnished as provided in Section 7.4, the written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Design Consultant prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.
- 9.9.5 The making of final payment shall constitute a waiver of all Claims by the Owner against the Contractor except those arising from:
- .1 Unsettled liens, and claims against the Owner or the Design Consultant, or their employees, agents, or representatives;
 - .2 Faulty, defective or non-conforming Work;
 - .3 Failure of the Work to comply with the requirements of the Contract Documents;
 - .4 Terms of any warranties contained in or required by the Contract Documents;
 - .5 Damages incurred by the Owner resulting from lawsuits brought against the Owner, the Design Consultant, or their agents, employees or representatives because of failures or actions on the part of the Contractor, his Subcontractors, Sub-subcontractors, or any of their employees, agents or representatives;
 - .6 Fraud or bad faith committed by the Contractor or any Subcontractor or supplier during performance of the Work but discovered by Owner after final payment; or
 - .7 Claims about which Owner did not have actual knowledge or which increase in scope or amount at the time of final payment.

- 9.9.6 The acceptance of final payment shall constitute a waiver of all Claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.
- 9.9.6.1 Notwithstanding any other provision of the Contract, Owner may withhold from Contractor payment otherwise due, as a result of any losses, expenses costs or damages suffered or anticipated to be suffered by Owner as a result of Contractor's breach of any provision of the Contract, including but not limited to Liquidated Damages or backcharges against Contractor.
- 9.10 OWNER'S RIGHT TO OCCUPY INCOMPLETE WORK
- 9.10.1 Should the Project, or any portion thereof, be incomplete for Substantial or Final Completion at the scheduled date or dates, the Owner shall have the right to occupy any portion of the Project. In such an event, the Contractor shall not be entitled to any extra compensation on account of said occupancy by the Owner or by the Owner's use of the Project, nor shall the Contractor interfere in any way with said use of the Project. Further, in such an event, the Contractor shall not be entitled to any extra compensation on account of the Owner's occupancy and use of the Project, nor shall the Contractor be relieved of any responsibilities of the Contract including the required times of completion. Such occupancy by the Owner shall not, in itself, constitute Substantial or Final Completion.
- 9.10.2 If the Owner exercises his rights under the foregoing and occupies the full Project, then there shall be no Liquidated Damages on account of failure on the Contractor's part to reach Substantial Completion from that date forward. This provision does not affect, however, any Liquidated Damages that would be assessed for any period of time between the contractual date of Substantial Completion and the date of any such occupancy. Further, this provision would have no effect on Liquidated Damages assessed on account of late Final Completion.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

- 10.1 SAFETY PRECAUTIONS AND PROGRAMS
- 10.1.1 The Owner, the Design Consultant, or their agents, employees or representatives are not responsible for the means, methods, techniques, sequences or procedures utilized by the Contractor, or for safety precautions and programs in connection with the Work. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. This requirement applies continuously throughout the Contract performance, until final payment is made and all punch list and warranty work is performed properly, and is not limited to regular working hours.
- 10.2 SAFETY OF PERSONS AND PROPERTY
- 10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:
- .1 All employees on the Work 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, machinery, equipment and all hazards shall be

- guarded or eliminated in accordance with all applicable safety regulations; and
- .3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and overhead or underground utilities not designated for removal, relocation or replacement in the course of construction.
- 10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, permits, rules, regulations and lawful orders of any public authority bearing on the safety or persons or property or their protection from damage, injury or loss.
- 10.2.2.1 The Contractor shall at all times safely guard the Owner's property from injury or losses in connection with the Contract. He shall at all times safely guard and protect his own work and adjacent property as provided by law and the Contract Documents, from damage. All passageways, guard fences, lights and other facilities required for protection by applicable safety regulations must be provided and maintained.
- 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.
- 10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.
- 10.2.5 The Contractor shall promptly remedy at his own cost and expense all damage or loss to any property referred to in Subparagraphs 10.2.1.2 and 10.2.1.3 caused by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under Subparagraphs 10.2.1.2 and 10.2.1.3, except damage or loss attributable solely to the acts or omissions of the Owner or Design Consultant 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 his obligations under Section 4.21. The Contractor shall perform such restoration by underpinning, repairing, rebuilding, replanting, or otherwise restoring as may be required or directed by the Owner, or shall make good such damage in a satisfactory and acceptable manner. In case of failure on the part of the Contractor to promptly restore such property or make good such damage, the Owner may, upon two (2) calendar days Notice, proceed to repair, rebuild or otherwise restore such property as may be necessary and the cost thereof, or a sum sufficient in the judgment of the Owner to reimburse the owners of property so damaged, will be deducted from any monies due or to become due the Contractor under the Contract.
- 10.2.6 The Contractor is responsible for the proper packing, shipping, handling and storage (including but not limited to shipment or storage at the proper temperature and humidity) of materials to be incorporated in the Work, so as to insure the preservation of the quality and fitness of the material for proper installation and incorporation in the Work, as required by the Contract Documents. For example, but not by way of limitation, Contractor shall, when necessary, place material on wooden platforms or other hard and clean surfaces and not on the ground and/or place such material under cover in any appropriate shelter or facility. Stored materials or equipment shall be located so as to facilitate proper inspection. Material and equipment which is delivered crated shall remain crated until ready for installation. Lawns, grass plots or other

private property shall not be used for storage purposes without the written permission of the Owner or lessee unless otherwise within the terms of the easements obtained by the Owner.

- 10.2.6.1 It shall be the responsibility of the Contractor in his preparation of phasing schedule of work operations after consulting with the other Prime Contractors to designate areas in which each Prime Contractor may store materials. Areas designed shall meet with the approval of the Design Consultant.
- 10.2.7 The Contractor shall give notice in writing at least forty eight (48) hours before breaking ground, to all persons, public utility companies, owners of property having structures or improvements in proximity to site of the Work, superintendents, inspectors, or those otherwise in charge of property, streets, water pipes, gas pipes, sewer pipes, telephone cables, electric cables, railroads or otherwise, who may be affected by the Contractor's operation, in order that they may remove any obstruction for which they are responsible and have representative on site to see that their property is properly protected. Such notice does not relieve the Contractor of responsibility for all damages, claims, or defense or indemnification of all actions against Owner resulting from performance of such work in connection with or arising out of Contract.
- 10.2.8 The Contractor shall investigate, locate, mark and protect all utilities encountered or to be encountered while performing the Work, whether indicated on the Drawings or not. The Contractor shall maintain utilities in service until moved or abandoned. The Contractor shall exercise due care when excavating around utilities and shall restore any damaged utilities to the same condition or better as existed prior to starting the Work, at no cost to the Owner. The Contractor shall maintain operating utilities or other services, even if they are shown to be abandoned on the Contract Drawings, in service until new facilities are provided, tested and ready for use.
- 10.2.9 The Contractor shall return all improvements on or about the site and adjacent property which are not shown to be altered, removed or otherwise changed to conditions which existed prior to starting the Work. The Contractor shall video record all areas or otherwise document the conditions existing at the site and in and around existing buildings prior to starting the Work. Submit documentation to the Design Consultant prior to beginning the Work.
- 10.2.10 The Contractor shall protect the Work, including but not limited to, the site, stored materials and equipment, excavations, and excavated or stockpiled soil or other material, intended for use in the Work, and shall take all necessary precautions to prevent or minimize damage to same or detrimental effect upon his performance or that of his Subcontractors, caused by or due to rain, snow, ice, run-off, floods, temperature, wind, dust, sand and flying debris; for example, but not by way of limitation, Contractor shall, when necessary, utilize temporary dikes, channels or pumping to carry-off divert or drain water, and shall as necessary tie-down or otherwise secure the Work and employ appropriate covers and screens.
- 10.2.11 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents and the protection of material, equipment and property. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner.
- 10.2.12 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.
- 10.2.13 Notification to the Contractor by the Owner or the Design Consultant of a safety violation will in no way relieve the Contractor of sole and complete responsibility for the correctness of said

violation or of sole liability for the consequences of said violation.

10.3 EMERGENCIES

- 10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. The Contractor shall notify the Owner of the situation and all actions taken immediately thereafter. If, in the opinion of the Contractor, immediate action is not required, the Contractor shall notify the Owner of the emergency situation and proceed in accordance with the Owner's instructions. Provided, however, if any loss, damage, injury or death occurs that could have been prevented by the Contractor's prompt and immediate action, the Contractor shall be fully liable for all costs, damages, claims, actions, suits, attorney's fees and all other expenses arising therefrom or relating thereto.

ARTICLE 11

INSURANCE

11.1 CONTRACTOR'S LIABILITY INSURANCE

- 11.1.1 The Contractor shall purchase and maintain in companies properly licensed by the Insurance Department of the State of North Carolina and acceptable to the Owner such insurance as will protect him, the Owner, and the Owner's agents, representatives, and employees from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts (with Workmen's Compensation and Employer's Liability Insurance in amounts not less than those necessary to meet the statutory requirements of the state(s) having jurisdiction over any portion of the Work);
- .2 Claims for damages because of bodily injury, sickness or disease, or death of his employees; the Contractor will require his Subcontractors to similarly provide Workmen's Compensation Insurance for all of the latter's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;
- .4 Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; and
- .6 Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

- 11.1.2 The insurance required by Paragraph 11.1.1 shall be primary and non-contributing to any insurance possessed or procured by the Owner, and limits of liability shall be not less than those set forth in these General Conditions of the Contract or required by law, whichever is greater.

- 11.1.3 The insurance required by the Contract shall include contractual liability insurance applicable to the Contractor's obligations under the Contract
- 11.1.4 Without limiting the above during the term of the Contract, the Contractor and each Subcontractor shall, at their own expense, purchase and maintain the following insurance with companies properly licensed by the Insurance Department of the State of North Carolina and satisfactory to the Owner.
- .1 Worker's Compensation including Occupational Disease and Employer's Liability Insurance.
 - .1 Statutory - Amount and coverage as required by State of North Carolina Worker's Compensation laws.
 - .2 Employer's Liability
 - \$1,000,000 Each Accident
 - \$1,000,000 Policy Limit
 - \$1,000,000 Each Employee
 - .2 Commercial General Liability (Occurrence Form) - The Contractor shall provide during the life of the Contract such Commercial General Liability (Occurrence Form) Insurance as shall protect him and any Subcontractor performing work under the Contract from claims for damages for Bodily Injury including accidental death, as well as from claims for Property Damage which may arise from operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by either of them. This insurance shall be on the Standard Insurance Services Office, Inc. (ISO) Commercial Liability Occurrence Form or other form reasonable acceptable to Owner. The Contractor shall procure insurance coverage for direct operations, sublet work, elevators, contractual liability and completed operations with limits not less than those stated below:
 - .1 A Combined Single Limit for Bodily Injury, Property Damage and Personal Injury of:
 - Limits of Insurance
 - \$2,000,000 General Aggregate (except Products – Completed Operations) Limit
 - \$2,000,000 Products – Completed Operations Aggregate Limit
 - \$1,000,000 Personal and Advertising Injury Limit
 - \$1,000,000 Each Occurrence Limit
 - .3 Property Damages, including Broad Form Property Damage and Explosion, Collapse, Underground property damage coverages, and blasting, where necessary;
 - .4 Completed Operations Liability: Continuous coverage in force for one year after completion of the Work;
 - .5 Commercial Automobile Insurance, including coverage for owned, non-owned and hired vehicles - with limits not less than those stated below:
 - .1 A Combined Single Limit for Bodily Injury and Property Damage of \$1,000,000.
 - .6 Umbrella Liability Insurance: Policy to "pay on behalf of the Insured"

Limits of Liability:

- .1 Contract Amount: \$1,000,000-\$2,000,000:
Requires Umbrella Liability Insurance Limit of \$1,000,000.
- .2 Contract Amount: \$2,000,000 and above:
Requires Umbrella Liability Insurance Limit of \$2,000,000.

- 11.1.5 The insurance required by Section 11.1 shall be written for not less than any limits of liability specified in the Contract Documents, or required by law, whichever is greater.
- 11.1.6 Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates shall contain a provision that coverages afforded under the policies will not be canceled until at least thirty (30) days' prior written Notice has been given to the Owner. Failure to provide such Notice shall not limit the liability of the Insurer, its agents or representatives.
- 11.1.7 All insurance policies required in this Article, except Worker's Compensation and Commercial Automobile, shall name the Owner as additional named insured for the insurance.
- 11.1.8 The Contractor shall not commence the Work under the Contract until he has obtained all the insurance required hereunder and such insurance has been approved by the Owner, nor shall the Contractor allow any Subcontractor to commence work on his subcontract until all similar insurance required of the Subcontractor has been so obtained and approved. Approval of the insurance by the Owner shall not relieve or decrease the liability of the Contractor hereunder.
- 11.1.9 The Commercial General Liability and Workers Compensation Policies provided by the Contractor shall have endorsements waiving subrogation against the Owner.

11.2 PROPERTY INSURANCE

- 11.2.1 The Contractor shall purchase and at all times maintain such insurance as will protect the Contractor, the Owner, Subcontractors and Sub-subcontractors from loss or damage to the Work or property in the course of construction, including all machinery, materials and supplies on the premises or in transit thereto and intended to become a part of the finished Work until Final Completion. This insurance shall be in the form of "Builders Risk Covered Cause of Loss Form", or equivalent form, to include but not limited to theft, collapse, earth movement, flood, and portions of the Work stored on site, off site and in transit. Any deductible provision in such insurance shall not exceed ten thousand dollars (\$10,000). Notwithstanding any such deductible provision, the Contractor shall remain solely liable for the full amount of any item covered by such insurance. Such insurance shall be in the initial Contract Sum and shall be increased at Contractor's expense in the amount of all additions to the Contract Sum. Such insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.
- 11.2.2 Any loss insured under Paragraph 11.2.1 is to be adjusted with the Owner and made payable to the Owner as trustee for the insureds, as their interests may appear, subject to the requirements of Paragraph 11.2.4. The Contractor shall pay each Subcontractor a just share of any insurance moneys received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each Subcontractor to make payments to his Sub-subcontractors in similar manner.

- 11.2.3 The Owner and Contractor waive all rights against each other for damages caused by fire or other perils to the extent their Claims are covered by insurance obtained pursuant to this Section 11.2, or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance. The Contractor shall require, by appropriate agreement, written where legally required for validity, similar waivers in favor of the Owner and the Contractor by Subcontractors and Sub-subcontractors. With respect to the waiver of rights of recovery, the term Owner shall be deemed to include, to the extent covered by property insurance applicable thereto, his consultants, employees, and agents and representatives. The Contractor waives as against any Separate Contractor described in Article 6, all rights for damages caused by fire or other perils in the same manner as is provided above as against the Owner. The Owner shall require, by appropriate agreement, written where legally required for validity, similar waivers in favor of the Contractor by any Separate Contractor and his subcontractors and sub-subcontractors.
- 11.2.4 The Owner as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five (5) days after the occurrence of loss to the Owner's exercise of this power, and if such objection is made, the matter shall be decided by a court of competent jurisdiction or as the parties in interest otherwise agree. The Owner as trustee shall, in that case, make settlement with the insurers in accordance with the orders of the court or as otherwise agreed by the parties in interest.
- 11.2.5 If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, such occupancy or use shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies. This insurance shall not be canceled or lapsed on account of such partial occupancy or use. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.
- 11.2.6 The Contractor bears the risk of loss or damage to the Work, the Project, materials stored on site or off site, and Owner's improvements and property under Contractor's control, both during construction and prior to Substantial Completion.
- 11.3 EFFECT OF SUBMISSION OF CERTIFICATES
- 11.3.1 The Owner shall be under no obligation to review any Certificates of Insurance provided by the Contractor or to check or verify the Contractor's compliance with any and all requirements regarding insurance imposed by the Contract Documents. The Contractor is fully liable for the amounts and types of insurance required herein and is not excused should any policy or certificate of insurance provided by the Contractor not comply with any and all requirements regarding insurance imposed by the Contract Documents.
- 11.4 FAILURE OF COMPLIANCE
- 11.4.1 Should the Contractor fail to provide and maintain in force any and all insurance, or insurance coverage required by the Contract Documents or by law, or should a dispute arise between Owner and any insurance company of Contractor over policy coverage or limits of liability as required herein, the Owner shall be entitled to recover from the Contractor all amounts payable, as a matter of law, to Owner or any other parties, had the required insurance or insurance coverage been in force. Said recovery shall include, but is not limited to interest for the loss of use of such amounts of money, plus all attorney's fees, costs and expenses incurred in securing such determination and any other consequential damages arising out of the failure of the

Contractor or insurance company to comply with the provisions of the Contract Documents, or any policy required hereby, or any other requirements regarding insurance imposed by law. Nothing herein shall limit any damages for which Contractor is responsible as a matter of law.

11.5 OWNER'S INSURANCE

11.5.1 Property Insurance: The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of his property due to fire or other hazards, however caused.

11.5.2 Commercial Public Liability Insurance: The Owner, at his option, may purchase and maintain insurance which will insure and protect him against claims involving bodily injury and property damage to the public. The Owner does not request his insurer to waive any right of subrogation against the Contractor from claims under this coverage.

11.6 LICENSED INSURANCE COMPANIES

11.6.1 All insurance companies providing the above insurance shall be licensed by the Insurance Department of the State of North Carolina and have a minimum AM Best "A" rating or similar rating from another rating agency reasonably acceptable to Owner.

ARTICLE 12

CHANGES IN THE WORK

12.1 GENERAL PROVISIONS RELATED TO CHANGES

12.1.1 A Construction Change Directive is a document issued pursuant to this Paragraph 12.1.1. The Owner may, at any time, without the agreement of the Contractor, by written order signed by the Owner and Design Consultant designated or indicated to be a Construction Change Directive, make any Changes in the Work or add to or subtract from the Work within the general scope of the Contract. A Change in the Work is defined as changes within the general scope of the Contract, including, but not limited to changes:

- .1 In the Specifications or Drawings;
- .2 In the sequence, method or manner of performance of the Work;
- .3 In the Owner-furnished facilities, equipment, materials, services or site; or
- .4 Directing acceleration in the performance of the Work.

12.1.2 A Change Order is a document executed pursuant to this Paragraph 12.1.2. The Owner and Contractor may agree to Changes in the Work, the Contract Sum, the Contract Time and any other change in the Contract by written agreement signed by Owner, Contractor and Design Consultant designated or indicated to be a Change Order. If the Contractor, subsequent to the issuance of a Construction Change Directive, agrees to its terms including any applicable adjustment to the Contract Sum and Contract Time, Contractor shall sign it and it shall become a Change Order.

12.1.3 The Contractor shall not be entitled to any amount for indirect costs, damages or expenses of any nature, including, but not limited to, so-called "impact" costs, labor inefficiency, wage, material or other escalations beyond the prices upon which the Proposal is based and to which

the parties have agreed pursuant to the provisions of Article 12, and which the Contractor, its Subcontractors or Sub-subcontractors or any other person may incur as a result of delays, interferences, suspensions, changes in sequence or the like, for whatever cause, whether reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable, arising from the performance of any and all Changes in the Work performed pursuant to this Article 12, unless the delay is caused solely by the Owner or its agent. It is understood and agreed that the Contractor's sole and exclusive remedy in the event the delay is caused solely by the Owner or its agent shall be recovery of his direct costs as compensable hereunder and an extension of the Contract Time, but only in accordance with the provisions of the Contract Documents. The phrase "Owner or its agent" as used in the Contract, does not include the Prime Contractors or their Subcontractors.

- 12.1.4 No Claim by the Contractor shall be allowed if asserted after final payment under this Contract. No Claim relating to or flowing from a particular change shall be allowed after execution of the Change Order relating to that change or commencement of the change by the Contractor except as specifically provided in Paragraph 12.2.4.
- 12.1.5 If any dispute should arise between the parties with respect to an increase or decrease in the Contract Sum or an expansion or contraction in the Contract Time as a result of a Change in the Work, the Contractor shall not suspend performance of a Change in the Work or the Work itself unless otherwise so ordered by the Owner in writing. The Owner shall, however, pay to the Contractor up to the Owner's reasonable estimated value of the Change in the Work, regardless of the dispute, if said Change in the Work will result in an increase in the Contract Sum; and the Owner shall have the right to withhold payment from the Contractor in an amount up to the Owner's reasonable estimated value of the Change in the Work, regardless of the dispute, if said Change in the Work will result in a decrease in the Contract Sum.
- 12.1.6 No Change in the Work shall be performed without a fully executed Change Order to the Contract a fully executed Construction Change Directive or other Modification to the Contract.
- 12.1.7 If the Contractor intends to assert a Claim under this Article, he must, within ten (10) days after receipt of a Construction Change Directive, Notify the Owner by written statement setting forth the specific nature and cost of such Claim, unless this period is extended by the Owner. The statement of Claim shall include all direct, indirect and impact costs associated with the change, as well as the Contractor's estimate of the schedule impact of the change, if any. The Contractor and its Subcontractors shall not be entitled to reimbursement for any Claims that are not submitted in strict conformance with the Contract. The Contractor shall indemnify and hold the Owner harmless against any Claims by Subcontractors that are waived because they are not submitted in strict conformance with the Contract.
- 12.2 OWNER DIRECTED CHANGES REQUIRING AN INCREASE IN CONTRACT SUM.
(For decreases in Contract Sum, refer to Section 12.6)
- 12.2.1 If the Change in the Work will result in an increase in the Contract Sum, the Owner shall have the right to require the performance thereof on a lump sum basis, a unit price basis or a time and material basis, all as hereinafter more particularly described (the right of the Owner as aforesaid shall apply with respect to each such Change in the Work).

If the Owner elects to have the Change in the Work performed on a lump sum basis, its election shall be based on a lump sum Proposal which shall be submitted by the Contractor to the Owner within ten (10) days of the Contractor's receipt of a request therefore (but the Owner's request for a lump sum Proposal shall not be deemed an election by the Owner to have the Change in

the Work performed on a lump sum basis). The Contractor's Proposal shall be itemized and segregated by labor and materials for the various components of the Change in the Work (no aggregate labor total will be acceptable) and shall be accompanied by signed Proposals of any Subcontractors who will perform any portion of the Change in the Work and of any persons who will furnish materials or equipment for incorporation therein. The Proposal shall also include the Contractor's estimate of the time required to perform said changes. The Contractor shall provide any documentation that may be requested by the Owner or Design Consultant to support the change proposal, including but not limited to payroll records, insurance rates, material quotes, and rental quotes.

The portion of the Proposal relating to labor, whether by the Contractor's forces or the forces of any of its Subcontractors, may include reasonably anticipated gross wages of job site labor, including foremen, who will be directly involved in the Change in the Work (for such time as they will be so involved), plus payroll costs (including premium costs of overtime time, if overtime is anticipated, Social Security, Federal or State unemployment insurance taxes and fringe benefits required by collective bargaining agreements entered into by the Contractor or any such Subcontractor in connection with such labor) and up to fifteen percent (15%) of such anticipated gross wages, but not payroll costs, as overhead and profit for the Contractor or any such Subcontractor, as applicable (said overhead and profit to include all supervision except foremen). Payroll costs are limited to 39% of the net pay of the worker.

The portion of the Proposal relating to materials may include the reasonably anticipated direct costs to the Contractor or to any of its Subcontractors of materials to be purchased for incorporation in the Change in the Work, plus transportation and applicable sales and use taxes and up to fifteen percent (15%) of said direct material costs as overhead and profit for the Contractor or any such Subcontractor (said overhead and profit to include all small tools), and may further include the Contractor's and any of its Subcontractor's reasonably anticipated rental costs in connection with the Change in the Work (either actual or discounted local published rates), plus up to eight percent (8%) thereof as overhead and profit for the Contractor or any such Subcontractors, as applicable. The Contractor shall provide an itemized breakdown of all transportation and shipping costs, including receipts documenting the expenses. Notwithstanding the above, overhead and profit shall not be applied to any sales tax paid for any purpose or to any transportation or shipping costs incurred by the Contractor or any subcontractor. If any of the items included in the lump sum Proposal are covered by unit prices contained in the Contract Documents, the Owner may, if it requires the Change in the Work to be performed on a lump sum basis, elect to use these unit prices in lieu of the similar items included in the lump sum Proposal, in which event an appropriate deduction will be made in the lump sum amount prior to the application of any allowed overhead and profit percentages. No overhead and profit shall be applied to any unit prices.

The lump sum Proposal may include up to eight percent (8%) of the amount which the Contractor will pay to any of its Subcontractors for Changes in the Work as overhead and profit for the Contractor. The Contractor shall not be reimbursed for the costs of the Subcontractors' Payment and Performance Bonds, as such bonding is not required by the Owner.

12.2.2 In the event that the Contractor fails to submit his Proposal within the designated period, the Owner may order the Contractor to proceed with the Change to the Work and the Contractor shall so proceed. The Owner shall unilaterally determine the reasonable cost and time to perform the Work in question, which determination shall be final and binding upon the Contractor. The Contractor may dispute such action in accordance with the Article 15.

12.2.3 In the event that the parties are unable to agree as to the reasonable cost and time to perform the

Change in the Work based upon the Contractor's Proposal and the Owner does not elect to have the Change in the Work performed on a time and material basis, the Owner may choose to make a determination of the reasonable cost and time to perform the Change in the Work, based upon its own estimates, the Contractor's submission or a combination thereof. A Construction Change Directive shall be issued in this case for the amounts of cost and time determined by the Owner and shall become final and binding upon the Contractor, subject to Contractor's right to dispute such action in accordance with Article 15. Owner has the right to direct by Construction Change Directive a Change in the Work, which is the subject of such Change Order. Failure of the parties to reach agreement regarding the cost and time of the performing the Construction Change Directive, shall not relieve the Contractor from performing the Change in the Work promptly and expeditiously.

12.2.3.1 The Owner reserves the right to reject the Contractor's Proposal for a Change in the Work and to elect to perform said Work using a Separate Contractor. Under such circumstances, all provisions of Article 6 shall be in force.

12.2.4 If the Owner elects to have the Change in the Work performed on a time and material basis, the same shall be performed, whether by the Contractor's forces or the forces of any of its Subcontractors or Sub-subcontractors, at actual cost to the entity performing the Change in the Work (without any charge for administration, clerical expense, supervision or superintendence of any nature whatsoever, including foremen, or the cost, use or rental of tools or plant), plus fifteen percent (15%) thereof as the total overhead and profit (except that said fifteen percent (15%) shall not be applied against any payroll costs, as set forth in Paragraph 12.2.1.) The Contractor shall submit to the Owner daily time and material tickets, on a daily basis to include the identification number assigned to the Change in the Work, the location and description of the Change in the Work, the classification of labor employed (and names and social security numbers), the materials used, the equipment rented (not tools) and such other evidence of cost as the Owner may require. The Owner may require authentication of all time and material tickets and invoices by persons designated by the Owner for such purpose. The failure of the Contractor to secure any required authentication shall, if the Owner elects to treat it as such, constitute a waiver by the Contractor of any Claim for the cost of that portion of the Change in the Work covered by a non-authenticated ticket or invoice; provided, however, that the authentication of any such ticket or invoice by the Owner shall not constitute an acknowledgment by the Owner that the items thereon were reasonably required for the Change in the Work.

12.2.5 No overhead and profit will be paid by the Owner on account of a Change in the Work except as specifically provided in Section 12.2. Overhead and profit, as allowed under Section 12.2, shall be deemed to include all costs and expenses which the Contractor or any of its Subcontractors may incur in the performance of a Change in the Work and which are not otherwise specifically recoverable by them pursuant to Section 12.2.

12.3 CONTRACTOR NOTICE OF CHANGE

12.3.1 If the Contractor or any of its Subcontractors asserts that any event or occurrence has caused a Change in the Work which change causes an increase or decrease in the Contractor's or its Subcontractors cost or the time required for the performance of any part of the Work under the Contract, including Work not affected directly by the change, the Contractor shall, within ten (10) days of such event, give the Owner written Notice as herein required. Said Notice shall include the instructions or circumstances that are the basis of the Claim and the Contractor's best estimate of the cost and time involved.

12.4 MINOR CHANGES IN THE WORK

12.4.1 The Owner shall have authority to order minor Changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

12.4.2 The Contractor shall not perform any Changes in the Work unless authorized in writing by the Design Consultant or Owner.

12.5 DIFFERING SITE CONDITIONS

12.5.1 Should the Contractor encounter subsurface and/or latent conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications or differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, or different from that shown on surveys or tests provided in the bid materials at the time the Owner solicited bids from the construction of the Project, he shall immediately give Notice to the Owner of such conditions before they are disturbed. The Owner and the Design Consultant shall thereupon promptly investigate the conditions and if they find that they materially differ from those shown on the Drawings or indicated in the Specifications, they shall at once make such changes in the Drawings and/or Specifications as they may find necessary. Any increase or decrease of cost resulting from such changes shall be adjusted in the manner provided herein for adjustments as to extra and/or additional work and changes. However, neither the Owner nor the Design Consultant shall be liable or responsible for additional work, costs or Changes to the Work due to material differences between actual conditions and any geotechnical, soils and other reports, surveys and analyses made available for the Contractor's review at the time the Owner solicited bids for the construction of the Project.

12.6 OWNER DIRECTED CHANGES REQUIRING A DECREASE IN CONTRACT SUM.

12.6.1 If the Change in the Work will result in a decrease in the Contract Sum, the Owner may request a quotation by the Contractor of the amount of such decrease. The following provisions shall apply:

The portion of the Proposal relating to labor, whether by the Contractor's forces or the forces of any of its Subcontractors, shall include reasonably anticipated gross wages of job site labor, including foremen, who would have been directly involved in the Work that has been deleted from the Contract, (for such time as they would have been so involved), plus payroll costs (including premium costs of overtime time, if overtime was anticipated, Social Security, Federal or State unemployment insurance taxes and fringe benefits required by collective bargaining agreements entered into by the Contractor or any such Subcontractor in connection with such labor) and seven percent (7%) of such anticipated gross wages, but not payroll costs, as overhead and profit not incurred or earned by the Contractor or any such Subcontractor, as applicable (said overhead and profit to include all supervision except foremen).

The portion of the Proposal relating to materials shall include the reasonably anticipated direct costs which would have been incurred by the Contractor or to any of its Subcontractors of materials which would have been purchased for incorporation in the Work but which has been deleted from the Contract, plus transportation and applicable sales and use taxes which will be avoided and seven percent (7%) of said direct material costs as overhead and profit not incurred or earned by the Contractor or any such Subcontractor (said overhead and profit to include all small tools), and shall further include the Contractor's and any of its Subcontractor's reasonably

anticipated rental costs which will be avoided (either actual or discounted local published rates), plus five percent (5%) thereof as overhead and profit not incurred or earned by the Contractor or any such Subcontractors, as applicable. If any of the items included in the lump sum Proposal are covered by unit prices contained in the Contract Documents, the Owner may elect to use these unit prices in determining the amount of reduction to the Contract Sum as a result of a deletion of Work from the Contract. No overhead and profit shall be applied to any unit prices for purposes of calculation such reduction in the Contract Sum.

The lump sum Proposal for Work which would have been performed by any Subcontractors shall include four percent (4%) of that amount as an estimate of the Contractor's overhead and profit that will not be earned by Contractor due to the decrease in the Contract Sum.

The Contractor's quotation shall be forwarded to the Owner within ten (10) days of the Owner's request and, if acceptable to the Owner, shall be incorporated in the Change Order. If not acceptable, the parties shall make every reasonable effort to agree as to the amount of such decrease, which may be based on a lump sum properly itemized, on unit prices stated in the Contract Documents and/or on such other basis as the parties may mutually determine. If the parties are unable to so agree, the amount of such decrease shall be the total of the estimated reduction in actual cost of the Work, as determined by the Owner in its reasonable judgment, plus overhead and profits stated above. This shall become final and binding upon the Contractor, subject to Contractor's right to dispute such action in accordance with the Article 15.

ARTICLE 13

UNCOVERING AND CORRECTION OF WORK

13.1 UNCOVERING OF WORK

13.1.1 If any portion of the Work is covered contrary to the request of the Owner or the Design Consultant or to requirements specifically expressed in the Contract Documents or to requirements of applicable construction permits, it must, if required in writing by the Owner, be uncovered for his observation and shall be replaced at the Contractor's expense.

13.1.2 If any other portion of the Work has been covered which the Design Consultant or the Owner has not specifically requested to observe prior to being covered, either may request to see such portion of the Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it is found that this condition was caused by the Owner, in which event the Owner shall be responsible for the payment of such costs. If such condition was caused by a Separate Contractor, Contractor may proceed against and only against, said Separate Contractor as provided in Article 6. Any costs to the Owner pursuant to this Paragraph shall be determined in accordance with the provisions of Article 12.

13.2 CORRECTION OF WORK

13.2.1 The Contractor shall promptly reconstruct, replace or correct portions of the Work rejected by the Design Consultant or Owner as defective or as failing to conform to the Contract Documents or as not in accordance with the guarantees and warranties specified in the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected portions of the

- Work, including compensation for the Design Consultant's and the Owner's additional construction management services made necessary thereby.
- 13.2.2 The Contractor, unless removal is waived by the Owner, shall remove from the site all portions of the Work which are defective or non-conforming, or if permitted or required, he shall correct such portions of the Work in place at his own expense promptly after receipt of Notice, and such rejected Work shall not thereafter be tendered for acceptance unless the former rejection or requirement for correction is disclosed.
- 13.2.3 If the Contractor does not proceed with the correction of such defective or non-conforming portions of the Work within a reasonable time fixed by written Notice from the Owner or Design Consultant, the Owner may either (1) by separate contract or otherwise replace or correct such portions of the Work and charge the Contractor the cost incurred by the Owner thereby and remove and store the materials or equipment at the expense of the Contractor, or (2) terminate this Contract for default as provided in Section 14.3, or both, or take any other measure allowed by law.
- 13.2.4 The Contractor shall bear the cost of making good all work of the Owner or Separate Contractors destroyed or damaged by such correction or removal.
- 13.2.5 Nothing contained in this Section 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Section 4.6 hereof. The establishment of the time period of one year after the date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which his 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 his obligations.
- 13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK
- 13.3.1 If the Owner prefers to accept defective or non-conforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable, or the Owner may elect to accept payment in materials or services, in lieu of a reduction in the Contract Sum. If the amount of a reduction is determined after final payment, it shall be paid to the Owner by the Contractor.

ARTICLE 14

TERMINATION OF THE CONTRACT

- 14.1 TERMINATION BY THE CONTRACTOR
- 14.1.1 If the Work is stopped for a period of one hundred twenty (120) days by the Owner or under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, and through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, then the Contractor may, upon seven (7) additional days' written Notice to the Owner and the Design Consultant, terminate the Contract and recover from the Owner payment on a quantum merit basis, for all Work executed for which Contractor has not previously been paid, less any amounts

Contractor may owe Owner under the Contract Documents and less any amounts Owner is entitled to withhold from Contractor or backcharge to the Contractor under the Contract Documents or pursuant to law. The Contractor shall not be entitled to collect and hereby expressly waives any overhead or profit on Work not performed and any damages related to that portion of the Contract which has been terminated.

14.2 TERMINATION FOR CONVENIENCE OF THE OWNER

14.2.1 The Owner may, at any time upon ten (10) days written Notice to the Contractor and to the Contractor's Surety, which Notice shall specify that portion of the Work to be terminated and the date said termination is to take effect, terminate (without prejudice to any right or remedy of the Owner) the whole or any portion of the Work for the convenience of the Owner. The Contractor's sole remedy, in the event of such termination, will be the allowable termination costs permitted by Section 14.4. Contractor shall include termination clauses identical to Article 14 in each of his subcontracts.

14.3 DEFAULT TERMINATION

14.3.1 Ten (10) days after written Notice is mailed to the Contractor and to the Contractor's Surety, the Owner may terminate (without prejudice to any right or remedy of the Owner or any subsequent buyer of any portion of the Work) the employment of the Contractor and his right to proceed either as to the whole or any portion of the Work required by the Contract Documents and may take possession of the Work and complete the Work by contract or otherwise in any one of the following circumstances:

- .1 If the Contractor or its Surety refuses or fails to prosecute the Work or any separable part thereof with such diligence as will ensure the Substantial and Final Completion of the Work by the dates specified in the Supplemental Conditions for Substantial and Final Completion or fails to complete the Work or remedy a default within said period;
- .2 If the Contractor is in material default in carrying out any provisions of the Contract;
- .3 If the Contractor fails to supply a sufficient number of properly skilled workers or proper equipment or materials;
- .4 If the Contractor fails to make prompt payment to Subcontractors or for materials or labor, unless he otherwise provides the Owner satisfactory evidence that payment is not legally due;
- .5 If the Contractor disregards laws, permits, ordinances, rules, regulations or orders of any public authority having jurisdiction, or fails to follow the instructions of the Owner;
- .6 If the Contractor substantially violates any provisions of the Contract Documents; or
- .7 If the Contractor refuses or fails to properly schedule, plan, coordinate and execute the Work, as specified herein, so as to perform the Work within the specified Completion Dates, or to provide scheduling or related information, revisions and updates as required by the Contract Documents.

14.3.2 The right of the Contractor to proceed shall not be so terminated under this Section 14.3 if the delays in the completion of the Work are due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor or his Subcontractors as specifically set forth

in Section 8.3 hereof.

- 14.3.3 If, after the Contractor has been terminated for default pursuant to Section 14.3, it is determined that none of the circumstances set forth in Paragraph 14.3.1 exist, then such termination shall be considered a termination for convenience pursuant to Section 14.2. In such case, the Contractor's sole remedy will be the costs permitted by Section 14.4.
- 14.3.4 If the Owner so terminates the employment of the Contractor due to the Contractor's default, the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the compensation to be paid to the Contractor hereunder shall exceed the expense of so completing the Work (including compensation for additional managerial, administrative, consultant and inspection services, attorney's fees and any damages for delay) such excess shall be paid to the Contractor.
- 14.3.5 If such expenses referenced in Paragraph 14.3.1, shall exceed the unpaid balance, the Contractor and his sureties shall be liable to the Owner for such excess. If the right of the Contractor to proceed with the Work is partially or fully terminated, the Owner may take possession of and utilize in completing the Work such materials, appliances, supplies, plant and equipment as may be on the site of the terminated portion of the Work and necessary for the completion of the Work. If the Owner does not fully terminate the right of the Contractor to proceed, the Contractor shall continue to perform the part of the Work that is not terminated.
- 14.3.6 If the Owner terminates the whole or any part of the Work pursuant to Section 14.3, the Owner may procure, upon such terms and in such manner as the Owner may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the Owner for any excess costs for such similar supplies or services. The Contractor shall continue the performance of the Contract to the extent not terminated hereunder.

14.4 ALLOWABLE TERMINATION COSTS

- 14.4.1 If the Owner terminates the whole or any portion of the Work pursuant to Section 14.2, then the Owner shall only be liable to the Contractor for those costs reimbursable to the Contractor in accordance with Paragraph 14.4.2, plus a markup of ten percent (10%) for profit and overhead on the actual fully accounted costs specified under Paragraph 14.4.2; provided however, that if there is evidence that the Contractor would have sustained a loss on the entire Contract had it been completed, no profit or overhead shall be included or allowed hereunder for the Work performed and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss. Under no circumstances shall the Contractor be entitled to any loss profit on the Work terminated pursuant to Section 14.2.
- 14.4.1.1 After receipt of a Notice of Termination, the Contractor shall submit to the Owner his termination Claim, in the form and with certification prescribed by the Owner. Such Claim shall be submitted promptly but in no event later than three (3) months from the effective date of termination, unless one or more extensions in writing are granted by the Owner upon request of the Contractor made in writing within such three (3) month period or authorized extension thereof. However, if the Owner determines that the facts justify such action, he may receive and evaluate any such termination Claim at any time after such three (3) month period or any extension thereof. Upon failure of the Contractor to submit his termination Claim within the time allowed, the Owner may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and such termination shall be final and binding on the Contractor.

- 14.4.2 If the Owner terminates the whole or any portion of the Work pursuant to Section 14.2, the Owner shall pay the Contractor an amount for supplies, services, or property accepted by the Owner, and which is in accordance with the Contract Documents, in an amount as if the Contract had not been terminated. In addition, in such event, the Owner shall pay to Contractor an amount representing Contractor's actual cost, excluding any overhead and profit for the items and things specified in Subparagraph 14.5.1.6 and not heretofore paid for, appropriately adjusted for any saving of freight or other charges. Under no circumstances shall the Contractor be entitled to any loss profit on the Work terminated pursuant to Section 14.2.
- 14.4.2.1 The Contractor agrees that neither the Owner nor the Design Consultant will be liable for payments to Contractors or Subcontractors pursuant to Section 14.4.2 unless each contract and subcontract contains termination provisions identical to those set forth in this Article 14. The Owner and the Design Consultant will not be liable to the Contractor or any of the Subcontractors for any costs associated with termination if the contract or subcontract of the party involved does not include the required termination language.
- 14.4.3 In arriving at any amount due the Contractor pursuant to Section 14.4, there shall be deducted the following:
- .1 All unliquidated advance or other payments on account theretofore made to the Contractor applicable to the terminated portion of the Contract;
 - .2 Any Claim which the Owner may have against the Contractor;
 - .3 Such amount as the Owner determines to be necessary to protect the Owner against loss because of outstanding or potential liens or claims; and
 - .4 The agreed price for, or the proceeds of sale of, any materials, supplies or other things acquired by the Contractor sold, pursuant to the provisions of Subparagraph 14.5.1.7, and not otherwise recovered by or credited to the Owner, or returned for a refund by the Contractor.
 - .5 All other amounts the Owner is entitled to withhold from the Contractor or charge to the Contractor pursuant to the Contract or as allowed by applicable law.
- 14.4.4 The total sum to be paid to the Contractor under Section 14.4 shall not exceed the Contract Sum as reduced by the amount of payments otherwise made or to be made for Work not terminated and as otherwise permitted by the Contract. Except for normal spoilage, and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor, as provided in Paragraph 14.4.2, the fair value, as determined by the Owner, of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the Owner, or to a buyer pursuant to Subparagraph 14.5.1.7.
- 14.5 GENERAL TERMINATION PROVISIONS
- 14.5.1 After receipt of a Notice of termination from the Owner, pursuant to Section 14.2 or 14.3, and except as otherwise directed by the Owner, the Contractor shall:
- .1 Stop work under the Contract on the date and to the extent specified in the Notice of termination;
 - .2 Place no further orders or subcontracts for materials, services or facilities, except as may

- be necessary for completion of such portion of the Work under the Contract as is not terminated;
- .3 Terminate all orders and subcontracts to the extent that they relate to the performance of the Work terminated by the Notice of termination;
 - .4 At the option of the Owner, and in lieu of terminating such orders and subcontracts, assign to the Owner in the manner, at the times and to the extent directed by the Owner in writing, all of the rights in the such orders and subcontracts,
 - .5 Settle all outstanding liabilities and all Claims arising out of such termination or orders and subcontracts, with the approval or ratification of the Owner in writing, to the extent he may require, which approval or ratification shall be final for all the purposes of this Article;
 - .6 Transfer title and deliver to the entity or entities designated by the Owner, in the manner, at the times and to the extent directed by the Owner to the extent specifically produced or specifically acquired by the Contractor for the performance of such portion of the Work as had been terminated, the following:
 - (1) The fabricated or unfabricated parts, Work in process, partially completed supplies and equipment, materials, parts, tools, dies, jigs and other fixtures, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of, the Work terminated by the Notice of termination; and
 - (2) The completed or partially completed plans, drawings, information, releases, manuals and other property related to the Work and which, if the Contract had been completed, would have been required to be furnished to the Owner;
 - .7 Use his best efforts to return for a refund or sell, in the manner, at the times, to the extent and at the price or prices directed or authorized by the Owner, any property of the types referred to in Subparagraph 14.5.1.6; provided, however, that the Contractor:
 - (1) Shall not be required to extend credit to any buyer, and
 - (2) May acquire any such property under the conditions prescribed by and at a price or prices approved by the Owner in writing; and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under the Contract or shall otherwise be credited to the Contract Sum covered by the Contract or paid in such other manner as the Owner may direct;
 - .8 Complete performance of such part of the Work as shall not have been terminated by the Notice of termination;
 - .9 Take such action as may be necessary, or as the Owner may direct, for the protection and preservation of the property related to the Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest; and
 - .10 Otherwise mitigate any damages Contractor claims to suffer as a result of a termination.
- 14.5.2 The Contractor shall, from the effective date of termination until the expiration of three (3) years after final settlement under the Contract, preserve and make available to the Owner, at all

reasonable times at the office of the Contractor, but without direct charge to the Owner, all his books, records, documents and other evidence bearing on the costs and expenses of the Contractor under the Contract and relating to the Work terminated hereunder, or, to the extent approved by the Owner, photographs, micro-photographs or other authentic reproductions thereof.

- 14.5.3 If the termination, pursuant to Section 14.2, be partial, the Contractor may file with the Owner a Claim for an equitable adjustment of the price or prices specified in the Contract relating to the continued portion of the Contract (the portion not terminated by the Notice of termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices. Any Claim by the Contractor for an equitable adjustment under this Paragraph must be asserted within thirty (30) days from the effective date of the Notice of termination.
- 14.5.4 The Contractor shall refund to the Owner any amounts paid by the Owner to the Contractor in excess of costs reimbursable under Section 14.4.
- 14.5.5 The Contractor shall be entitled to only those damages and that relief from termination by the Owner as specifically provided in Article 14.

ARTICLE 15

DISPUTE RESOLUTION

15.1 INITIATING CLAIMS

- 15.1.1 Claims must be initiated by written Notice to the Owner and to the party against whom the Claim is made with a copy to the Design Consultant. The responsibility to substantiate Claims shall rest with the party making the Claim.
- 15.1.2 Nothing in the Contract shall be construed as meaning that the Owner's assessment of Liquidated Damages is a Claim as defined herein, or that the Owner has the burden of proof to assess Liquidated Damages. Should the Owner assess Liquidated Damages, the burden of proving that such damages should not have been assessed shall rest upon the Contractor.

15.2 RESOLUTION OF CLAIMS AND DISPUTES BETWEEN CONTRACTOR AND OWNER

- 15.2.1 Claims by Contractor against Owner and by Owner against Contractor, including those alleging an error or omission by the Design Consultant shall be subject to the process set forth in this Section 15.2. Such Claims shall be referred initially to the Design Consultant for a decision. A final decision by the Design Consultant, or the failure of the Design Consultant to issue a final decision shall be required as a condition precedent to mediation or litigation of all such Claims arising prior to the date final payment is due. The Design Consultant will initially decide disputes between Owner and Contractor.
- 15.2.2 The Design Consultant will review Claims by Contractor and Owner against each other and within twenty (20) days of the receipt of the written Claim and 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 Design Consultant is unable to resolve the Claim if the Design Consultant lacks sufficient information to evaluate the merits of the Claim or if the Design Consultant concludes that it would be inappropriate for the Design Consultant to resolve the Claim.
- 15.2.3 In evaluating Claims made under this Section 15.2, the Design Consultant may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who assist the Design Consultant in rendering a decision.
- 15.2.4 If the Design Consultant requests a party to provide a response to a Claim under this Section 15.2, or to furnish additional supporting data, such party shall respond, within ten (10) days after receipt of such request, and shall within such time period, either provide a response to the requested supporting data, advise the Design Consultant when the response or supporting data will be furnished, or advise the Design Consultant that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Design Consultant will either reject or approve the Claim in whole or in part.
- 15.2.5 The Design Consultant will approve or reject Claims under this Section 15.2 by written decision, which shall state the reason thereof and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Design Consultant under this Section 15.2 shall be final and binding on the parties but subject to mediation and litigation.
- 15.2.6 When a written decision of the Design Consultant under this Section 15.2 states that the decision is final but subject to mediation, then a demand for mediation of a Claim covered by such decision must be made within thirty (30) days after the date on which the party making the demand receives the final written decision. Any failure to demand mediation within said thirty (30) days' period shall result in the Design Consultant's decision becoming final and binding to all parties. Claims not resolved in mediation shall be subject to litigation if in accordance with the applicable statutes of limitation and repose.
- 15.2.7 Upon receipt of a Claim under Section 15.2 against the Contractor or at any time thereafter, the Design Consultant or 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 Design Consultant or the Owner may, but are not obligated to, notify the Surety and request the Surety's assistance in resolving the controversy.
- 15.2.8 If the Design Consultant deems that a Claim under this Section 15.2 is valid, the Design Consultant shall require all parties to the dispute to share the cost of the Design Consultant's review equitably. If the Design Consultant deems that a Claim under this Section 15.2 is invalid, the Design Consultant shall require the complaining party to bear the cost of the Design Consultant's review. In any event, the Design Consultant may require the complaining party to submit a deposit equivalent to the Design Consultant's hourly rate multiplied by the amount of time the Design Consultant estimates, in the Design Consultant sole discretion, that will be necessary to review the Claim. The Design Consultant shall return any unused portion of this initial deposit to the complaining party following the Design Consultant's completion of the Design Consultant's review of the Claim. Nothing in these procedures shall entitle the Design

Consultant to compensation for additional services from the Owner that is not authorized pursuant to the terms and conditions of the Agreement for Design Consultant Services.

15.3 TIME LIMITS ON CLAIMS

15.3.1 Unless a shorter time is provided in the Contract Documents, Claims by Contractor or any party except Owner must be initiated within twenty (20) days after occurrence of the event giving rise to such Claim or within twenty (20) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims against the Owner shall be initiated in strict conformance with the Contract Documents. Nothing in these procedures shall extend the period within or the manner in which Claims against the Owner must be submitted. Claims must be initiated by written Notice to the Owner and written notice to the other party and to the Design Consultant. Any Claim against the Owner that is not initiated within the applicable time period is waived. Claims by Owner may be made at any time within the applicable statute of limitations and repose.

15.4 CONTINUING CONTRACT PERFORMANCE

15.4.1 Pending final resolution of a Claim, the Contractor shall proceed diligently with the performance of the Contract, unless instructed otherwise in writing by the Owner.

15.5 MEDIATION

15.5.1 As required by N.C.G.S 143-128 (f1), any Claim as defined herein, which exceeds fifteen thousand dollars(\$15,000.00), and which concerns a party involved in the Project, including the Owner, Contractor, Design Consultant, any construction manager, Separate Contractors, or first and lower tier Subcontractors and which arise out of the Contract or the construction process, except those waived Claims shall, be subject to mediation as a condition precedent to the institution of legal proceedings by any party, except that any party may institute legal proceedings or perfect any mechanic's or materialmen's lien in order to meet any applicable statute of limitations or similar deadline prior to engaging in mediation.

15.5.2 The parties shall endeavor to resolve their Claims under this Section 15.5 by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the rules established by the Owner.

15.5.3 The parties shall share cost of the mediation equally except that if the Owner is a party to the dispute, the Owner shall pay at least one third of the cost of the mediation.

15.5.4 The mediation shall be held in a place where the Project is located, unless another location is mutually agreed upon.

15.5.5 Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

END OF GENERAL CONDITIONS

SECTION 00 73 00
SUPPLEMENTAL CONDITIONS

GENERAL CONDITIONS

Document GC, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, constitutes the General Conditions of this Contract, and is hereinafter called "General Conditions." The General Conditions are further revised and supplemented by the provisions of these Supplemental Conditions. The General Conditions and the Supplemental Conditions are applicable to all of the Work under this contract and shall apply to the Contractor and all Subcontractors and Sub-subcontractors.

SUPPLEMENTS:

The following supplements modify, change, delete, or add to the General Conditions. Where any article of the General Conditions is modified or any paragraph deleted, subparagraph or clause thereof is modified, or deleted by these supplements, the unaltered provisions of such article, paragraph, subparagraph or clause shall remain in effect. If there is a discrepancy between the General Conditions and these Supplemental Conditions, the Supplemental Conditions shall control.

ARTICLE 1 - CONTRACT DOCUMENTS

ADD THE FOLLOWING TO 1.3.1:

1.3.1.1 The Contractor will be furnished with one set drawings and specifications for free.

ARTICLE 2 - ARCHITECT

ADD THE FOLLOWING TO PARAGRAPH 2.1:

Design Consultant:

SfL+a Architects
333 Fayetteville Street
Suite 225
Raleigh, NC 27601
(919) 573-6350

ARTICLE 4 – CONTRACTOR

ADD THE FOLLOWING AFTER THE FIRST SENTENCE OF PARAGRAPH 4.24:

The Owner’s policies are available for review at <https://boardpolicyonline.com/bl/?b=harnett>

ARTICLE 7 – MISCELLANEOUS PROVISIONS

ADD THE FOLLOWING TO THE END OF 7.1.1

The Contractor and Owner agree that Harnett County, North Carolina shall be the proper venue for any litigation arising out of this Agreement.

ARTICLE 8 - TIME

ADD THE FOLLOWING TO PARAGRAPH 8.2:

8.2.4 The schedule below contains certain specific dates in addition to date of Notice to Proceed and Time for Completion. These dates shall be adhered to and are the last acceptable dates unless modified by mutual agreement between the Contractor and the Owner. All dates indicate midnight unless otherwise stipulated. The only exceptions to this schedule are defined in the General Conditions and Supplemental Conditions under Paragraph 8.3 DELAYS AND EXTENSIONS OF TIME.

Notice of Intent to Award – October 23rd, 2024

Return of Owner Contractor Agreement by Contractor – November 8th, 2024

Notice to Proceed – November 22nd, 2024

Substantial Completion – November 21st, 2025

Final Completion – 30 days from the date of Substantial Completion

8.2.4.1 The Owner reserves the right to withhold the issuance of Notice to Proceed by up to forty-five (45) days. For each day that Notice to Proceed is withheld pursuant to this Subparagraph, the dates established for Substantial Completion and Final Completion shall be adjusted. The contractor shall not be entitled to additional compensation if the owner withholds the issuance of Notice to Proceed pursuant to this Subparagraph.

ADD THE FOLLOWING AS A NEW SECOND SENTENCE TO PARAGRAPH 8.3.1:

The Contractor acknowledges that the coronavirus (COVID-19) pandemic has impacted businesses across the country.

REPLACE SECTION 8.3.4.2.3 WITH THE FOLLOWING PARAGRAPHS:

8.3.4.2.3 Excessive inclement weather; however, the Contract time will not be extended due to reasonably anticipated inclement weather or for delays in the aftermath of inclement weather, reasonably anticipated or excessive. The time for performance of this Contract, as stated in the Contract Documents, includes an allowance for calendar days which may not be available for construction out-of-doors; for the purposes of this Contract, the Contractor agrees that the number of calendar days per month based on a five-year average shall be considered reasonably anticipated inclement weather and planned for in the construction schedule and the Contract Documents. Unless the Contractor can substantiate to the satisfaction of the Owner that there was greater than the reasonably anticipated inclement weather considering the time from the notice-to-proceed until the building is enclosed using data from the national weather service station acceptable to the Parties and that such alleged greater than reasonably anticipated inclement weather actually delayed the Work or portions thereof which had an effect upon the Contract time, the Contractor shall not be entitled to an extension of time.

For the purpose of this Contract, the Contractor agrees to anticipate and plan for inclement weather for the number of calendar days in accordance with the following table:

Planned days/month	
Jan	10
Feb	9
Mar	9
Apr	8
May	9

Jun	10
Jul	12
Aug	11
Sep	7
Oct	6
Nov	7
Dec	10

Also the Contractor agrees that the calculation of the number of excessive inclement weather days shall be the number of days in excess of those shown for each month in the table above, in which precipitation exceeded one tenth (.10) inch, or in which the highest temperature was 32 degrees F or less as recorded at the approved weather station.

If the total accumulated number of calendar days lost to excessive inclement weather, from the notice-to-proceed until the building is enclosed, exceeds the total accumulated number to be reasonably anticipated for the same period from the table above, time for completion will be extended by the number of calendar days needed to include the excess number of calendar days lost. No extension of time will be made for days due to excessive inclement weather occurring after the building is enclosed. For the purpose of this Contract, the term "enclosed" is defined to mean when the building is sufficiently roofed and sealed, either temporarily or permanently, to permit the structure to be heated and the plastering and dry-wall trades to work. The Design Consultant shall determine when the structure is "enclosed". Upon the request of either party, the Design Consultant shall issue a letter certifying to the Owner, with a copy to the Contractor, stating the date the building became enclosed. No change in Contract sum will be authorized because of adjustment of Contract time due to excessive inclement weather; and

ADD THE FOLLOWING TO PARAGRAPH 8.5.1:

- 8.5.1.1 Substantial Completion Liquidated Damages shall be the sum of One Thousand Five Hundred dollars (\$1,500.00) per calendar day, and this amount shall be assessed in accordance with Subparagraph 8.5.1 of the General Conditions.
- 8.5.1.2 Final Completion Liquidated Damages shall be the sum of Seven Hundred Fifty dollars (\$750.00) per calendar day, and this amount shall be assessed in accordance with Subparagraph 8.5.1 of the General Conditions.

ARTICLE 9 - PAYMENTS AND COMPLETION

ADD THE FOLLOWING TO PARAGRAPH 9.6:

- 9.6.3 Additional services and dispute resolution services by the Design Consultant shall be paid by the Contractor at the rate of Three Hundred dollars (\$300.00) per hour.

ARTICLE 11 – INSURANCE

ADD THE FOLLOWING NEW PARAGRAPH TO THE END OF SECTION 11.1.4

- 11.1.4.7 The Contractor shall obtain and maintain in effect during the term of this Agreement a policy of pollution liability in the minimum amount of \$1,000,000 each claim, \$1,000,000 policy pollution policy aggregate. This coverage may be placed via combined contractor's professional and pollution liability policy, separate contractor's pollution liability policy or by use of the limited jobsite pollution liability endorsement to the commercial general liability policy. Continuous coverage shall be maintained in force for a period of six (6) years following

the date of final completion of the work. Contractor shall be responsible for any applicable deductible. If the project includes any environmental abatement or remediation work (e.g. asbestos, mold, lead paint, or UST), the Contractor shall obtain and maintain in effect during the term of this Agreement policies for pollution liability covering this specific type of work, which policies shall protect the Owner and Contractor from claims in an amount not less than \$1,000,000 for each claim. Coverage may be procured directly by the Contractor or through policy placed on behalf of the environmental abatement subcontractor.

ARTICLE 15 – DISPUTE RESOLUTION

ADD THE FOLLOWING NEW PARAGRAPH 15.6:

- 15.6 The Owner's Dispute Resolution Policy required by N.C.G.S. § 143-128(f1) is contained in Policy 6420 (<https://boardpolicyonline.com/bl/?b=harnett#&&hs=TOC%3a6>). The Dispute Resolution Policy is also included in the bid and contract documents.

END OF SUPPLEMENTAL CONDITIONS

SECTION 01 02 00
GENERAL SITEWORK REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SITEWORK LAYOUT

A. Monuments and Benchmarks

1. Maintain all monuments, property corners, bench marks and other reference points.
2. If these are disturbed or destroyed during construction operations, have them replaced by a surveyor licensed in the State of North Carolina. This replacement shall be at no additional expense to the Contract.

B. Laying out the Work.

1. Locate all existing bench marks and other reference points.
2. Protect these points throughout construction.
3. Layout work utilizing these reference points.

C. Record Drawings

1. Maintain a record of the locations of all underground utilities and piping.
2. Maintain a record of any variations of the work.
3. Record Drawings shall be certified by a Land Surveyor registered in the State of North Carolina.
4. Submit these record drawings at Project Closeout.

1.3 EASEMENTS

- A. Verify the acquisition of all off-site easements and Rights-of-Way prior to the start of off-site construction. This may be done by contacting the Architect.
- B. Restore all off-site easements to the condition existing prior to the start of work.

1.4 MAINTENANCE OF TRAFFIC

- A. Maintain vehicular and pedestrian traffic across the frontage of this project. Comply with all applicable safety requirements.

1.5 SUBMITTALS

- A. For those submittals, close-out documents and O&M manuals requiring review by the architect's consultants, contractor shall ship such documents directly to the consultant, while sending a copy of the transmittal to the architect.

1.6 CORRELATION OF CONSTRUCTION DOCUMENTS

- A. Review construction documents thoroughly prior to the start of construction.
- B. Report any conflict or discrepancy discovered in the Construction Documents to the Architect prior to the start of construction.
- C. Report any conflict or discrepancy discovered between the Construction Documents and state and local governmental regulations to the Architect prior to the start of construction.

1.7 PROJECT CONDITIONS

- A. The conditions existing at the time of inspection for bidding purposes will be maintained by the Owner to the extent practical. However, minor variations may occur due to natural occurrences prior to the start of work.
- B. The location of existing underground utilities indicated is approximate only. Field locate all existing underground utilities in the area of work, regardless of whether or not they are indicated. Call "NC one call" at 1800-632-4949 prior to the start of demolition work for assistance in the location of existing underground utilities.
- C. Should charted, uncharted or incorrectly charted utilities be encountered during demolition, contact the Architect immediately for instructions. Cooperate with Owner and utility companies to keep services and facilities in operation.

1.8 SCHEDULING

- A. Do not begin work on any off-site roadway improvements until the owner has acquired and recorded all easements and right-of-way required to complete the project.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 – EXECUTION

3.1 PROJECT CLEAN UP

- A. Clean site as construction progresses. Do not allow trash or other waste materials to accumulate.

- B. Prior to requesting the punch-list inspection, clean the site to the following requirements:
 - 1. Power wash all walks and pavements.
 - 2. The remainder of the site shall be broom clean.
 - 3. Remove all trash and debris.

3.2 EXISTING FACILITIES

- A. Preserve existing signs, markers, guardrails and fences in their original condition unless written permission is obtained for their removal and replacement.
- B. Replace damaged items at no additional cost to the Contract.

END OF SECTION

SECTION 01 10 00**SUMMARY****PART 1 GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Contract description.
 - 2. Work by Owner or others.
 - 3. Owner-furnished products.
 - 4. Contractor's use of site and premises.
- B. Specification Conventions:
 - 1. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall," or "shall be," or "shall comply with," depending on context, are included by inference where a colon (:) is used within sentences or phrases.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

1.3 CONTRACT DESCRIPTION

- A. Work of the Project includes construction of the project identified in the Contract Documents.
- B. Perform Work of Contract under contract with the Owner for:
 - 1. Stipulated Sum Contract.
- C. Coordinate Work with utilities of Owner, and utilities of public and private agencies.
- D. Permits: Acquire and furnish all necessary permits for the Work.
- E. Contract Work Includes:
 - 1. Work as indicated in the Project Manual, on Drawings and all other Contract Documents.

1.4 WORK BY OWNER OR OTHERS

- A. Coordinate Work with work provided by Owner to facilitate work sequencing and scheduling to include, but not limited to, Owner provided inspection services and utilities of Owner and public or private agencies.
- B. NIC (Not in Contract): Items noted NIC (Not in Contract), will be furnished and installed by Owner after substantial completion or prior to substantial completion when Work sequence requires or allows such coordination between Contractor and Owner.

1.5 OWNER-FURNISHED PRODUCTS

- A. Items noted in the Contract Documents as to be furnished by the Owner:
 - 1. Owner's Responsibilities:
 - a. Arrange for and deliver Owner-reviewed Shop Drawings, Product Data, and Samples, to Contractor.
 - b. Arrange and pay for delivery to site.
 - c. On delivery, inspect products jointly with Contractor.
 - d. Submit claims to Owner's provider for transportation damage and replace damaged, defective, or deficient items.
 - e. Arrange for manufacturers' warranties, inspections, and service as may be required from Owner's provider.
 - 2. Contractor's Responsibilities:
 - a. Review Owner-reviewed Shop Drawings, Product Data, and Samples.
 - b. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - c. Handle, store, install and finish products.
 - d. Repair or replace items damaged after receipt.
 - 3. Products furnished to site and installed by Owner:
 - a. As indicated in the Contract Documents.
 - 4. Items furnished by Owner for installation by Contractor:
 - a. As indicated in the Contract Documents.

1.6 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Access to Work Area of Site: Limited to Contractors, Owner, Authorities Having Jurisdiction, Emergency Response Entities, Architect and Consultants.
- B. Tobacco and Related Products Restriction:
 - 1. Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
 - 2. Use of any form of tobacco and related product is not permitted on the construction site or any school property.
- C. Electronic Smoking Devices Restriction: Use of electronic smoking and vapor devices are not permitted on the construction site or any school property.
- D. Firearms Restriction: Firearms are prohibited on the construction site. As minimum, signs indicating restriction are to be posted at entrances to construction site and at contractor's onsite office site trailer.
- E. Restriction Signage: As minimum, signs indicating all site restrictions are to be posted at entrances to construction site and at contractor's onsite office site trailer. Comply with other site signage requirements as may be indicated.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 21 00**ALLOWANCES****PART 1 GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by Allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Allowance Types include the following:
 - 1. Unit Cost Allowances.
 - 2. Stipulated Sum Allowances
 - 3. Quantity Allowances.
 - 4. Contingency Allowances.
- C. Related Requirements:
 - 1. Division 01 Section "Unit Prices" for requirements related to Unit Prices.
 - 2. Division 01 Section "Alternates" for requirements related to Alternates.
 - 3. Division 01 Section "Contract Modification Procedures".
 - 4. Division 01 Section "Quality Requirements" for procedures governing the use of allowances for testing and inspection.
 - 5. Divisions 03 through 33 Sections for items of work covered by allowances.

1.3 ALLOWANCES - CONTRACT SUM

- A. Include in the Contract Sum all Allowances stated in the Contract Documents.

1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product and system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the work.
- C. Purchase products and systems selected by Architect from the designated supplier and perform allowance work requirements.

1.5 ACTION SUBMITTALS

- A. Submit proposals for allowance work requirements included in allowances. Refer to Section 01 26 00 - Contract Modification Procedures.
 - 1. Include product data, shop drawing, and sample submittals for allowance items in same manner as for other portions of the Work.

1.6 INFORMATIONAL SUBMITTALS

- A. Submit invoices and delivery slips to show actual costs, and actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for services, and installation costs of allowance items that include installation as part of the allowance.

1.7 COORDINATION

- A. Contractor:
 - 1. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.
 - 2. Include each allowance as separate line item in the Schedule of Values.
 - 3. Assist Architect in selection of products, suppliers, and installers.
 - 4. Obtain suppliers' and installers' cost data. Submit lump sum cost proposals for the work to Architect and offer recommendations. Refer to Section 01 26 00 - Contract Modifications: Proposal procedures.
 - a. Include itemized explanation and documentation of proposed costs.
 - b. Cost is to be based upon completing the work within the Contract Time.
 - 5. Owner written approval is required prior to allowance work and use of allowance funds.
 - a. Progress payments for allowance work are not to be requested until Owner has provided written approval of the Contractor's proposal for the allowance work.
 - 6. Upon Architect's notification of Owner approval, execute purchase agreement with designated supplier and installer.
 - 7. Obtain and process shop drawings, product data, and samples.
 - 8. Provide for delivery and, upon delivery, promptly inspect products for completeness, damage, and defects. Submit claims for transportation damage to supplier and delivery service.
- B. Architect:
 - 1. Consult with Contractor regarding consideration and selection of products, suppliers, and installers.
 - 2. Consult with Owner to acquire Owner decisions and transmit decisions to Contractor.
 - 3. Prepare approval notification indicating the appropriate allowance and the amount authorized to be used with attached approved proposals and work descriptions. Distribute for authorization by Contractor and Owner.

1.8 UNUSED MATERIALS

- A. After allowance work has been completed and accepted, return unused materials purchased to supplier for credit to Owner and document the credit back to the allowance line item on the next Application for Payment.
 - 1. If requested by Owner, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed by Owner.

1.9 CHANGES TO ALLOWANCES

- A. Remaining allowance amounts will be credited to Owner by Change Order at closeout of Contract.
 - 1. Owner may choose to require credit for remaining amount, or portion thereof, prior to closeout of Contract.
- B. Change to an Allowance Amount:
 - 1. In the event of a variance between an allowance amount and the approved actual cost, submit a Change Order proposal requesting a change in the Contract Sum.

- a. Unit Cost Allowances: Change amount is to be the actual unit cost difference multiplied by the bid quantity.
 - b. Stipulated Sum Allowances: Change amount is to be the difference between the stipulated sum and the approved actual cost.
 - c. Quantity Allowances: Change amount is to be the actual quantity difference multiplied by the apportioned unit cost that was included in the Contract Sum.
 - 1) Exception: Contractor provided bid unit prices for Division 01 Section "Unit Prices" will be the multiplier for quantities greater or less than the allowance quantity when such corresponding work is indicated in "Unit Prices".
 - d. Contingency Allowances: Change amount is to be the difference between the allowance sum and the approved actual costs.
- C. Include itemized explanation and documentation to substantiate changes.
 - D. No change to Contractor's indirect expense is permitted for selection of higher- or lower-cost materials or systems of the same scope and nature as originally indicated.
 - E. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
 - F. Change in Allowance Scope:
 - 1. Submit documentation of a claim for change in scope of allowance work described in the Contract Documents.
 - 2. Do not include Contractor's or subcontractor's indirect expense in the Change Order proposal cost amount unless you have clearly documented that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.

1.10 UNIT COST ALLOWANCES (UCA)

- A. Included in Unit Cost Allowance:
 - 1. Purchase and Delivery Costs: Costs to Contractor including purchase of materials and equipment, delivery to site, and required purchase taxes, less applicable trade discounts.
- B. Other related costs not included in allowance but to be included in Contract Sum:
 - 1. Installation and Other Related Costs: Costs to Contractor including handling, unloading, storage, protection, services, installation and finishing, overhead, profit, bonding, insurance, payroll taxes, rental equipment, incidentals, and other expenses required to complete the installation.
- C. Use information indicated in the Contract Documents to determine bid quantities.
- D. Schedule of Unit Cost Allowances indicated in Part 3 of this Section.

1.11 STIPULATED SUM ALLOWANCES (SSA)

- A. Included in Stipulated Sum Allowance:
 - 1. All costs to Contractor including purchase of materials and equipment, delivery to site, taxes, handling, unloading, storage, protection, services, installation and finishing, overhead, profit, bonding, insurance, payroll taxes, rental equipment, incidentals, and other expenses required to complete the installation.
- B. Schedule of Stipulated Sum Allowances indicated in Part 3 of this Section.

1.12 QUANTITY ALLOWANCES (QA)

- A. Included in Quantity Allowance:

1. All costs to Contractor including purchase of materials and equipment, delivery to site, taxes, handling, unloading, storage, protection, services, installation and finishing, overhead, profit, bonding, insurance, payroll taxes, rental equipment, incidentals, and other expenses required to complete the installation.
- B. Schedule of Quantity Allowances indicated in Part 3 of this Section.

1.13 CONTINGENCY ALLOWANCES (CA)

- A. Included in Contingency Allowances:
 1. All costs to Contractor including purchase of materials and equipment, delivery to site, taxes, handling, unloading, storage, protection, services, installation and finishing, overhead, profit, bonding, insurance, payroll taxes, rental equipment, incidentals, and other expenses required to complete the installation.
- B. Schedule of Contingency Allowances indicated in Part 3 of this Section.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 GENERAL

- A. Allowance work requirements to be same as similar work type requirements indicated in the Contract Documents unless indicated otherwise.

3.2 SCHEDULE - UNIT COST ALLOWANCES (UCA)

- A. **UCA-1: Unit Masonry - BRK1.**
 1. Unit Cost: \$450.00 per thousand units.
 2. Include the stated unit cost for purchase and delivery for face brick. Installation and all other related costs to be included in Contract Sum.
 3. Refer to Section 04 20 00 - Unit Masonry.

3.3 SCHEDULE - STIPULATED SUM ALLOWANCES (SSA)

- A. **SSA-1: Security System.**
 1. Stipulated Sum: \$200,000.
 2. Include the stated stipulated sum for purchase, delivery, installation, and all other related costs for various technology equipment.
 - a. Equipment types may include the following:
 - 1) Cameras.
 - 2) Security.
 - 3) Electronic security door hardware.
 - 4) Associated equipment.
 3. Allowance is for work in addition to base bid work indicated in Contract Documents.
 4. Locations to be indicated by Architect.

3.4 SCHEDULE - QUANTITY ALLOWANCES (QA)

- A. **QA-1: Woven Geo-Textile Separation and Stabilization Fabric In-Place.**
1. Quantity: 500 square yards.
 2. Include the stated quantity of work for purchase, delivery, installation, and all other related costs.
 3. Coordinate with Division 01 Section "Unit Prices".
 4. Locations to be approved by [Architect] [Owner's Engineer] [Site Design Engineer].
- B. **QA- 2: Removal of Unsuitable Soil (Bulk).**
1. Quantity: 750 cubic yards.
 2. Include the stated quantity of work for purchase, delivery, installation, and all other related costs.
 3. Coordinate with Division 01 Section "Unit Prices".
 4. Locations to be approved by [Architect] [Owner's Engineer] [Site Design Engineer].
- C. **QA-3: Removal of Unsuitable Soil (Trench).**
1. Quantity: 250 cubic yards.
 2. Include the stated quantity of work for purchase, delivery, installation, and all other related costs.
 3. Coordinate with Division 01 Section "Unit Prices".
 4. Locations to be approved by [Architect] [Owner's Engineer] [Site Design Engineer].
- D. **QA-4: Replacement of Removed Unsuitable Soils or Rock with Off-Site Suitable Soils In-Place.**
1. Quantity: 1,000 cubic yards.
 2. Include the stated quantity of work for purchase, delivery, installation, and all other related costs.
 3. Coordinate with Division 01 Section "Unit Prices".
 4. Locations to be approved by [Architect] [Owner's Engineer] [Site Design Engineer].
- E. **QA-5: Replacement of Removed Unsuitable Soils or Rock with Off-Site Aggregate Base Course In-Place.**
1. Quantity: 500 cubic yards.
 2. Include the stated quantity of work for purchase, delivery, installation, and all other related costs.
 3. Coordinate with Division 01 Section "Unit Prices".
 4. Locations to be approved by [Architect] [Owner's Engineer] [Site Design Engineer].

3.5 SCHEDULE - CONTINGENCY ALLOWANCES (CA)

- A. **CA-1: General Contingency Allowance.**
1. Stipulated Sum: \$150,000.00.
 2. Include the stated stipulated sum for use as directed by Owner.

END OF SECTION

SECTION 01 22 00**UNIT PRICES****PART 1 GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Unit price requirements for use in preparing Bids.
 - 2. Measurement and payment criteria applicable to Work performed under a unit price payment method and associated Bid requirements.
 - 3. Defect assessment and non-payment for rejected Work.
 - 4. Schedule of Unit Prices.
- B. Related Requirements:
 - 1. Bidding Documents and Forms: Instructions for preparation of pricing for Unit Prices.
 - 2. Drawing and Specification requirements related to the work type indicated by the items listed in this Section under the Schedule of Unit Prices.

1.3 COSTS INCLUDED IN UNIT PRICES

- A. Unit Prices included on the Bid Form shall include full compensation per unit of Work including, but not limited to, all required labor, overhead, profit, products, tools, equipment, plant fees, excavation, disposal fees, loading, transportation, services, incidentals, erection, application, and installation of a unit of the Work.

1.4 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the bidding documents and forms are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.5 MEASUREMENT OF QUANTITIES

- A. Measurement methods delineated in the individual specification Sections complement the criteria of this Section. In the event of conflict, the requirements of the individual specification Section govern.
 - 1. Measurement for replacement fill of authorized excavated voids shall be based on volume of void to be filled with compacted fill.
 - 2. Measurement for fabric and sheet products installed horizontally, is not to include excess and/or overlaps.
 - 3. Measurement for other types of Work is indicated within the individual Unit Price requirement in the Schedule of Unit Prices at the end of this Section.
- B. Take all measurements and compute quantities. Maintain records.
 - 1. Measurements and quantities will be verified by a soils and materials engineer employed by the Owner.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.
- D. Measurement Devices:

1. Weigh Scales: Inspected, tested, and certified by the applicable State department within the past year.
 2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle. Certified by the applicable State department within the past year.
 3. Metering Devices: Inspected, tested, and certified by the applicable State department within the past year.
- E. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- F. Measurement by Volume: Measured by cubic dimension using mean length, width, and height or thickness.
- G. Measurement by Area: Measured by square dimension using mean length and width or radius.
- H. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- I. Stipulated Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.6 PAYMENT

- A. Payment for Work governed by unit prices will be made based on the actual measurements and quantities of Work that is incorporated into or made necessary by the Work.
- B. Payment will not be made for any of the following:
1. Products wasted or disposed of in a manner that is not acceptable.
 2. Products determined as unacceptable before or after placement.
 3. Products not completely unloaded from the transporting vehicle.
 4. Products placed beyond the lines and levels of the required Work.
 5. Products remaining on hand after completion of the Work.
 6. Loading, hauling, and disposing of rejected Products.

1.7 DEFECT ASSESSMENT

- A. Replace Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of Owner, it is not practical to remove and replace the Work, Owner will direct remedies as follows:
1. The defective Work will remain or be partially repaired to the instruction of the Owner, and at the discretion of the Owner, the unit price will be adjusted as follows:
 - a. Reduced to a new unit price.
 2. The authority of Owner to assess the defect, direct remedies, and establish adjustment in unit price and payment is final.
- C. The Contract, General Conditions of the Contract, Supplementary General Conditions, or individual specification Sections may modify these options or may identify a specific formula or percentage price reduction.

1.8 DOCUMENTATION

- A. Section 01 32 00 - Construction Progress Documentation: Reports.
- B. Maintain record of delivery tickets for replacement fill materials delivered to the jobsite. Indicate date, time, origin location, hauler, material description, quantities, and weight.

PART 2 PRODUCTS (NOT USED)**PART 3 EXECUTION****3.1 SCHEDULE OF UNIT PRICES**

- A. Provide unit prices for the following Work in compliance with the Contract Documents for similar Work and as directed by Architect.
1. Refer to "Costs Included in Unit Prices" article in this Section.
 2. Purpose:
 - a. To adjust the contract sum if the Owner requires construction in addition or subtraction to that indicated in the Contract Documents.
 - b. To adjust the contract sum for approved variance in quantities indicated for the Quantity Allowances as indicated in Division 01 Section "Allowances".
- B. **Unit Price No. 1 - Exit Sign.**
1. Include circuitry and hardware. Conduits and boxes to be concealed and recessed.
 2. Unit Price: Provide bid price per each.
- C. **Unit Price No. 2 - Surface Mounted Speaker/Strobe.**
1. Include circuitry and hardware. Conduits and boxes to be concealed and recessed.
 2. Unit Price: Provide bid price per each.
- D. **Unit Price No. 3 - Smoke Detector.**
1. Include circuitry and hardware. Conduits and boxes to be concealed and recessed.
 2. Unit Price: Provide bid price per each.
- E. **Unit Price No. 4 - Heat Detector.**
1. Include circuitry and hardware. Conduits and boxes to be concealed and recessed.
 2. Unit Price: Provide bid price per each.
- F. **Unit Price No. 5 - Fire Alarm Pull Station.**
1. Include circuitry and hardware. Conduits and boxes to be concealed and recessed.
 2. Unit Price: Provide bid price per each.
- G. **Unit Price No. 6 - Sidewalk.**
1. Unit Price: Provide bid price per square yard.
 2. Refer to C5.0 for Concrete Sidewalk details.
- H. **Unit Price No. 7 - Site Bollards.**
1. Unit Price: Provide bid price per each.
 2. Refer to 10/A503 for detail.
- I. **Unit Price No. 8 - Woven Geo-Textile Separation and Stabilization Fabric In-Place.**
1. Unit Price: Provide bid price per square yard.
 2. Quantity Allowance: Contractor shall include an allowance price in the Base Bid for quantity indicated in Schedule - Quantity Allowances in Division 01 Section "Allowances".
 - a. Coordinate unit price with quantity allowance price.
 - b. Refer to requirements in Division 01 Section "Allowances".

- J. Unit Price No. 9 - Removal of Unsuitable Soils (Bulk).**
1. Disposal to be off-site.
 2. Unit Price: Provide bid price per cubic yard.
 3. Quantity Allowance: Contractor shall include an allowance price in the Base Bid for quantity indicated in Schedule - Quantity Allowances in Division 01 Section "Allowances".
 - a. Coordinate unit price with quantity allowance price.
 - b. Refer to requirements in Division 01 Section "Allowances".
- K. Unit Price No. 10 - Removal of Unsuitable Soils (Trench).**
1. Disposal to be off-site.
 2. Unit Price: Provide bid price per cubic yard.
 3. Quantity Allowance: Contractor shall include an allowance price in the Base Bid for quantity indicated in Schedule - Quantity Allowances in Division 01 Section "Allowances".
 - a. Coordinate unit price with quantity allowance price.
 - b. Refer to requirements in Division 01 Section "Allowances".
- L. Unit Price No. 11 - Removal of Rock (Bulk).**
1. Disposal to be off-site.
 2. Unit Price: Provide bid price per cubic yard.
 3. Quantity Allowance: Contractor shall include an allowance price in the Base Bid for quantity indicated in Schedule - Quantity Allowances in Division 01 Section "Allowances".
 - a. Coordinate unit price with quantity allowance price.
 - b. Refer to requirements in Division 01 Section "Allowances".
- M. Unit Price No. 12 - Removal of Rock (Trench).**
1. Disposal to be off-site.
 2. Unit Price: Provide bid price per cubic yard.
 3. Quantity Allowance: Contractor shall include an allowance price in the Base Bid for quantity indicated in Schedule - Quantity Allowances in Division 01 Section "Allowances".
 - a. Coordinate unit price with quantity allowance price.
 - b. Refer to requirements in Division 01 Section "Allowances".
- N. Unit Price No. 13 - Replacement of Removed Unsuitable Soils or Rock with Off-Site Suitable Soils In-Place.**
1. Suitable soil fill approval required. Moisture control and compaction required.
 2. Do not include costs related to the removal of unsuitable soils or rock. Unit price for removal is provided for in other Unit Price item in this Section.
 3. Unit Price: Provide bid price per cubic yard.
 4. Quantity Allowance: Contractor shall include an allowance price in the Base Bid for quantity indicated in Schedule - Quantity Allowances in Division 01 Section "Allowances".
 - a. Coordinate unit price with quantity allowance price.
 - b. Refer to requirements in Division 01 Section "Allowances".

- O. **Unit Price No. 14 - Replacement of Removed Unsuitable Soils or Rock with Off-Site Aggregate Base Course In-Place.**
1. Aggregate fill approval required and is to be Certified ABC material. Compaction required.
 2. Do not include costs related to the removal of unsuitable soils or rock. Unit price for removal is provided for in other Unit Price item in this Section.
 3. Unit Price: Provide bid price per cubic yard.
 4. Quantity Allowance: Contractor shall include an allowance price in the Base Bid for quantity indicated in Schedule - Quantity Allowances in Division 01 Section "Allowances".
 - a. Coordinate unit price with quantity allowance price.
 - b. Refer to requirements in Division 01 Section "Allowances".

END OF SECTION

SECTION 01 23 00**ALTERNATES****PART 1 GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Alternates.
 - 2. Schedule of Alternates.
- B. Related Requirements:
 - 1. Bidding Documents and Forms: Instructions for preparation of pricing for Alternates.
 - 2. Drawing and Specification requirements related to the work type indicate by the items listed in this Section under the Schedule of Alternates.

1.3 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, manufacturer, or installation methods described in the Contract Documents.
 - 1. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Agreement.
 - 2. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 3. 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.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. 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.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule of Alternates:
 - 1. Schedule of Alternates included in Part 3 of this Section.

PART 2 PRODUCTS (Not Used)**PART 3 EXECUTION****3.1 SCHEDULE OF ALTERNATES**

- A. Alternate No. 1 - Composite Door Assemblies (Owner Preferred):**
1. Refer to Section 08 17 43 - Integrated Composite Door Opening Assemblies.
 2. Provide Integrated Composite Door Opening Assemblies: Special-Lite, no substitutions.
- B. Alternate No. 2 - Door Hardware.**
- a. Refer to Section 08 71 00 - Door Hardware.
 - 2. Alternate No. 2A - Locks and Latches (Owner Preferred):**
 - a. Provide Locks and Latches: Schlage, no substitutions.
 - b. Includes wireless options as specified and all equipment required for installation / operation.
 - 3. Alternate No. 2B - Exit Devices (Owner Preferred):**
 - a. Provide Exit Devices: Von Duprin, no substitution.
 - 4. Alternate No. 2C - Closers (Owner Preferred):**
 - a. Provide Closers: LCN 4111, no substitutions.
 - 5. Alternate No. 2D - Continuous Hinges (Owner Preferred):**
 - a. Provide Continuous Hinges: Ives, no substitutions.
 - 6. Alternate No. 2E - Grand Master Key System (Owner Preferred):**
 - a. Provide Grand Master Key System: Best, no substitutions.
- C. Alternate No. 3 - Plumbing Fixtures.**
- a. Refer to Plumbing Schedules on Drawings.
 - 2. Alternate No. 3A - Faucets (Owner Preferred):**
 - a. Provide Plumbing Fixture Faucets: Sloan, no substitutions.
 - 3. Alternate No. 3B - Flush Valves (Owner Preferred):**
 - a. Provide Plumbing Fixture Flush Valves: Sloan, no substitutions.
 - 4. Alternate No. 3C - Water Coolers (Owner Preferred):**
 - a. Provide Plumbing Fixture Water Coolers: Elkay, no substitutions.
- D. Alternate No. 4 - Plumbing Piping Valves (Owner Preferred):**
1. Refer to Section 22 05 23 - General-Duty Valves for Plumbing Piping.
 2. Provide Plumbing Valves: Apollo, no substitutions.
- E. Alternate No. 5 - HVAC Equipment (Owner Preferred):**
1. Refer to Division 23 - HVAC Equipment.
 2. Provide HVAC Equipment: Trane, no substitutions.
- F. Alternate No. 6 - Lighting (Owner Preferred):**
1. Refer to Section 26 51 16 - Lighting.
 2. Provide 2x4 Lay-In Fixtures: Lithonia CPX 2X4 4000LM M2 for fixtures A1 and A1E, no substitutions.
- G. Alternate No. 7 - Electrical Switchboards (Owner Preferred):**
1. Refer to Section 26 24 13 - Switchboards.
 2. Provide Switchgear: Square D, no substitutions.
- H. Alternate No. 8 - Fire Alarm System (Owner Preferred):**
1. Refer to Section 28 31 11 - Digital, Addressable Fire Alarm System.
 2. Provide Fire Alarm System: EST4 System - Edwards Inc., no substitutions.

END OF SECTION

SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 PROPOSAL REQUESTS

- A. Owner Initiated Proposal Requests: Architect will issue 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.
1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 2. Within 15 days after receipt of Proposal Request, submit a quotation indicating the net cost and net time adjustments to the Contract Sum and the Contract Time necessary to execute the change. The terms "net cost" and "net time" as used herein shall mean the difference between the additions and deductions of all properly applied cost and time.
 - a. Document each quotation for change in net cost or net time with sufficient data to allow evaluation of quotation.
 - b. Include a list of quantities and prices of products and materials required or eliminated, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - d. Include costs of labor and supervision directly attributable to the change.
 - e. 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.
- B. 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 Architect.
1. Include a statement outlining reasons for the proposed change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. The terms "net cost" and "net time" as used herein shall mean the difference between the additions and deductions of all properly applied cost and time.
 - a. Document each quotation for change in net cost or net time with sufficient data to allow evaluation of quotation.

- b. Include a list of quantities and prices of products and materials required or eliminated, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
- c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
- d. Include costs of labor and supervision directly attributable to the change.
- e. 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.
- f. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.4 MINOR CHANGES IN THE WORK

- A. Architect will issue to Contractor 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.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

- A. Submittals: Submit name of individual authorized to receive change documents.
- B. Contractor is responsible for informing others in Contractor's employ, subcontractors, and suppliers of approved changes to the Work.
- C. Stipulated Sum Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Owner and Architect.
- D. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit price basis. For unit costs and quantities of units of work which are not pre-determined, execute Work under Construction Change Directive.
- E. Construction Change Directive: Architect may issue directive, on AIA Form G714 Construction Change Directive signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining and change in Contract Sum or Contract Time. Promptly execute change.
- F. Execution of Change Orders: Architect will issue Change Orders on AIA Document G701 for signatures by parties as provided in Conditions of the Contract.
- G. Correlation of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum.
 - 2. Promptly revise construction schedule to reflect changes in the work and its effect on other items of work affected by the changes, and resubmit.

3. Promptly enter changes in Project Record Documents.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue 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.
 1. Construction Change Directive contains a description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of directed change, submit an itemized accounting and supporting data necessary to substantiate cost and time adjustments to the Contract. Approved changes to the Contract will be authorized by Change Order.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes: Administrative and procedural requirements.
1. Schedule of Values.
 2. Applications for Payment.
- B. Related Requirements:
1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of Allowances.
 2. Division 01 Section "Unit Prices" for administrative requirements governing the use of Unit Prices.
 3. Division 01 Section "Alternates" for administrative requirements governing the Alternates.
 4. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 5. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Contract Start Date: The date of Commencement of the Work as established by the provisions of the Contract.
- B. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values in duplicate to Architect within fifteen (15) days after Contract Start Date.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.

- c. Architect's project number.
- d. Contractor's name and address.
- e. Date of submittal.
2. Arrange schedule of values consistent with format of AIA Document G703.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - a. Include separate line items under principal subcontracts for project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
 - 1) If LEED or other sustainable design requirements are included in the project, include line items for such documentation.
 - b. Include the following costs as separate line items:
 - 1) Site mobilization.
 - 2) Bonds.
 - 3) Insurance.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
6. Divide each part of the Work into separate line items in the schedule of values that indicate the following for individual parts of the Work:
 - a. Cost of materials.
 - b. Cost of installation.
7. Allowances:
 - a. Provide a separate line item in the schedule of values for each allowance.
 - b. For unit cost allowances, show line item value as a product of the unit cost, multiplied by bid quantity. Use information indicated in the Contract Documents to determine bid quantities.
8. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
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.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
10. For each application for payment period, add line items to the schedule of value indicating change orders approved after the previous period.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid by Owner.
- B. Payment Period: Submit at monthly intervals or as otherwise stipulated in the Agreement.
 1. Submit draft copy of Application for Payment seven (7) days prior to due date for review by Architect.
- C. Application for Payment Forms:

1. AIA Document G702, "Application and Certificate for Payment".
 2. AIA Document G703, "Continuation Sheet for G702".
 3. Other forms required at appropriate times include the following. Forms for the same purpose indicated here may be superseded by other forms if indicated otherwise in the Contract:
 - a. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims".
 - b. AIA Document G706A, "Contractor's Affidavit of Release of Liens".
 - c. AIA Document G707, "Consent of Surety to Final Payment".
 - d. AIA Document G707A, "Consent of Surety to Reduction in or Partial Release of Retainage".
- D. Application Preparation: Complete every entry on form. Certification of Application to be by a person authorized to sign legal documents on behalf of Contractor. Certification to be Notarized. 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 approved Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Include retainage requirements indicated in the Contract Documents.
- E. Substantiating Data: When Architect requires substantiating information, submit data justifying dollar amounts in question.
- F. Payroll Reports: Submit data for projects requiring compliance with or reporting for the following:
1. Davis Bacon Act, as Amended.
 2. Government Grant funding programs.
- G. Stored Materials: Provisions for progress payment for stored materials are indicated in the General Conditions of the Contract. Such provisions are subject to modifications that may be indicated in the Owner/Contractor Agreement or Supplementary General Conditions. Additional provisions are as follows:
1. Provide a summary report documenting stored materials indicating the following:
 - a. Differentiate between items stored on-site and items stored off-site.
 - b. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - c. Value of previously stored materials installed as part of the Work after date of previous Application for Payment and on or before date of current Application for Payment.
 - d. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
 - e. 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.
 2. Materials Stored Off-Site: When approvals are granted by Owner and other required parties, approvals are to be acquired by Contractor in writing prior to inclusion in next Application for Payment and such written approvals are to be included with the Application for Payment. Payment requests are to match the written approvals. The written approvals are to include all supporting documentation that was submitted for review to gain approval. Such supporting documentation may include, but not be

- limited to, certificates of insurance, bonds, paid invoices and consent of surety to payment.
- H. Transmittal: Submit four signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. 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.
 2. Submit with transmittal letter as specified for Submittals in Section 01 33 00 - Submittal Procedures.
- I. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from Contractor, subcontractors, sub-subcontractors, suppliers of materials and equipment, and all performers of Work, labor or services for construction period covered by the previous application.
1. Include AIA Document G706A, "Contractor's Affidavit of Release of Liens" with supporting documentation referenced as attached thereto.
 2. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 3. When an application shows completion of an item, submit conditional final or full waivers.
 4. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 5. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
- J. Initial Application for Payment: Administrative actions and submittals that must precede submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule requirements.
 4. Products list requirements.
 5. Schedule of unit prices.
 6. Submittal schedule requirements.
 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.
- K. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work certified 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 Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- L. Final Payment Application: After completing all Project Work and Closeout Requirements, submit final Application for Payment with required releases and supporting documentation not previously submitted and accepted, including, but not limited to, the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.

3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final Documentation for Minority Business Enterprise.
9. Final liquidated damages settlement statement.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. General Coordination Procedures.
 2. Coordination Drawings.
 3. Building Information Model (BIM).
 4. Requests for Information (RFIs).
 5. Project Meetings.

1.3 INFORMATIONAL SUBMITTALS

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

1.4 GENERAL COORDINATION PROCEDURES

- A. Electronic Document Management Service (EDMS): Comply with Section 01 31 26 - Electronic Communication Protocols. Provide an internet-based EDMS for electronic construction management document control, processing, review actions, reporting, communications, and other project documentation.
- B. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Project meetings.
 - 6. Startup and adjustment of systems.
 - 7. Project closeout activities and requirements.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown 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.
- D. Coordination Meetings: In addition to other meetings specified in this Section, Contractor is to conduct coordination meetings with personnel and Subcontractors to ensure coordination of Work.
- E. Coordinate work as to conceal pipes, ducts, electrical conduit and wiring within construction and in a manner as to not be seen. Exceptions are mechanical rooms and electrical rooms and as otherwise approved in writing by Architect.
- F. Coordinate locations of fixtures, outlets, and electrical and data devices with finish elements.
- G. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.
- H. After Owner occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

3.2 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and re-solve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - e. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawings Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 3. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 4. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 5. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, piping slopes, valves, conduit runs, and include insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts, and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 6. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.

- d. Location of pull boxes and junction boxes dimensioned from column center lines.
7. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
8. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
9. Coordination Drawings Submittal: Prepare coordination drawings according to requirements and with descriptive titles with logical sequencing numbers. Submit coordination drawings to Architect as follows and in format acceptable to Architect.
 - a. Printed Submittal: Submit three (3) paper copies of drawings to Architect as indicated for submittals in Division 01 Section "Submittal Procedures."
 - b. Digital Submittal: Submit drawings via the Contractor provided Electronic Document Management Service (EDMS) as digital formatted files. This Digital Submittal is in addition to the Printed Submittal and only applies when the Contract Documents require the Contractor to provide an Electronic Document Management Service (EDMS).

3.3 BUILDING INFORMATION MODEL (BIM)

- A. Contractor is to produce a Building Information Model (BIM) for the entire project. Architect's model can be used as a base on which the Contractor's BIM can be developed, updated, and integrated into Contractor's EDMS.
- B. Contractor's BIM is to be completed within the following number of days:
 1. Thirty (30) days after the Contract Start Date.
- C. Contractor's BIM shall be used to interpret the construction documents and analyze all elements of the Coordination Drawing tasks, especially related to clash analysis and systems coordination.
- D. Contractor's BIM shall be made available to Architect and its consultants, contractors, and sub-contractors for daily use in the field during construction tasks.
- E. Contractor's BIM is to be incorporated and integrated into the Contractor's EDMS - BIM integration program.
 1. Integration program is to be compatible with the project's Electronic Document Management Service EDMS.
- F. Contractor is to provide tutorial instruction to all major subcontractor forepersons on the use of the BIM model during the construction period. Contractor is to provide or require all forepersons to be equipped with an iPad type device to be able to access the coordination drawings and model. Contractor is to provide or require wireless access throughout the construction areas for continuous access to BIM information modeling information.
- G. Clash detection and coordination shall be done using Navisworks software (or equivalent). Contractor shall track clash resolution using a 3D coordination log that includes fields for, at a minimum, clash tolerance, clash name, clash group #, area, level, description, x-y coordinates, responsibility, date identified, open/closed status, date closed, priority, and resolution.
- H. Contractor shall require trade contractors to model, at a minimum, structural steel, envelope connections, secondary framing, any element that requires seismic bracing, studs, drywall,

- ceilings, mechanical, electrical, data, plumbing, gas, fire protection, pneumatic tube, and any racked elements.
1. Trade contractors shall use intelligent 3D modeling software such as Revit.
 2. Trade contractor's modeling of steel, connections, and M/E/P/FP/LV systems shall be to LOD 400. Trade contractor's modeling shall be as detailed as necessary to accurately represent the major construction elements being modeled (i.e. curtain wall should not be modeled as a solid wall, but should have separate elements for mullions and glass).
- I. Models are to include clearances and access zones for code and for anything requiring a human hand to touch it for operating or maintaining the facility.
1. Trade contractors shall apply the following model standards for models used for clash detection and coordination:
 - a. Purge model files of any extraneous 2D references and 3D rogue elements prior to submission.
 - b. Keep file size to minimum for application speeds.
 - c. Keep text and line work on different layers from 3D components where possible.
 - d. Clean up drawings and remove items drawn off to the sides of drawings.
 - e. Use separate layers for space constraints.
 - f. Detach x-refs from drawings.
 - g. Do not draw on the "0" layer.
 - h. Change view settings to 2D wireframe.
 - i. Place model in top view.
 - j. Zoom extents.
- J. The combined coordination model for a particular area/zone must be clash free prior to the submission of trade contractor shop drawings. Both the combined coordination models and combined shop drawings shall be signed off by all trade contractors. For projects where structure is being installed in an area before coordination is complete in that area, all sleeve and penetration coordination must be complete prior to full construction coordination, and in time to support the structural installation.

3.4 REQUESTS FOR INFORMATION (RFIs)

- A. Requests for Information are to be submitted by the Contractor for Designer's action via the Contractor's Electronic Document Management Service (EDMS).
- B. Definition: An RFI is a request seeking one of the following:
1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, assembly, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- C. Whenever timely and possible, request clarifications at the next appropriate project progress meeting, with response recorded in meeting minutes, rendering unnecessary the submittal of an RFI.
- D. Acceptable Uses for RFIs: Contractor good faith effort to determine resolution from Contract Documents.
1. Prior to submitting an RFI, carefully study all Contract Documents to confirm that sufficient information for interpretation is not included in Contract Documents.

- E. Unacceptable Uses for RFIs: Architect will return unacceptable RFIs without review action. Unacceptable RFIs include the following:
1. Request for approval of submittals (see Section 01 33 00 - Submittal Procedures).
 2. Request for approval of substitutions (see Section 01 60 00 - Product Requirements).
 3. Request for approval of Contractor means and methods (Contractor's responsibility).
 4. Requests for coordination information already indicated in the Contract Documents.
 5. Changes in the Work requirements, Contract Time, or Contract Sum (see Section 01 26 00 - Contract Modification Procedures).
 6. Request from other entities controlled by Contractor. Do not forward requests which solely require internal coordination between Contractor its contract entities.
 7. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response.
 8. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- F. Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. RFI Form: AIA Document G716 with supporting attachments; combined into single PDF format electronic file.
 2. Coordinate and submit RFIs in a prompt manner as to avoid delays in the Work. Failure to submit an RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
- G. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name and Architect's Project Number.
 2. Date.
 3. Name of Contractor.
 4. Name of Architect.
 5. RFI number, numbered sequentially.
 6. RFI subject.
 7. Specification Section number and title and related paragraphs, as appropriate.
 8. Drawing number and detail references, as appropriate.
 9. Field dimensions and conditions, as appropriate.
 10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 11. Contractor's certification signature attesting to Contractor's good faith effort to determine from the Contract Documents information requiring interpretation.
 12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- H. Architect's Action: Allow seven (7) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. on a working day will be considered as received the following working day.
1. Content of Architect's response to RFIs will not constitute, in any manner, a directive or authorization to perform extra work or delay the project. If Contractor believes the Architect's response is likely to lead to a change to Contract Sum or Contract Time,

- promptly issue a notice to this effect, and follow up with an appropriate Change Proposal (see Section 01 26 00 - Contract Modification Procedures).
2. Architect's action may include a request for additional information from Contractor, in which case Architect's time for response will date from time of receipt of additional information.
- I. RFI Log: Maintain current status of RFI's via the Contractor provided Electronic Document Management Service (EDMS).
 - J. Promptly review Architect's response action and provide direction to the affected parties.
 1. If an additional or corrected response is required, notify Architect within seven (7) calendar days of the Architect's response action, by submitting to Architect an amended version of the original RFI, identified as specified above.

3.5 PROJECT MEETINGS - GENERAL

- A. Contractor is to schedule and conduct meetings and conferences at Project site unless otherwise indicated or agreed upon by Contractor, Owner and Architect.
- B. Attendees: Inform participants and others involved, and individuals whose presence is required, of the date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
- C. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
- D. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to relevant parties, including Owner and Architect, within three (3) days of the meeting.
- E. Project meetings include, but are not limited to, the following and are indicated with more detail further in this Section.
 1. Preconstruction Meeting.
 2. Site Mobilization Meeting.
 3. Progress Meetings.
 4. Pre-Installation Meetings.
 5. Closeout Meeting.

3.6 PRECONSTRUCTION MEETING

- A. Contractor is to schedule and conduct a Preconstruction Meeting before starting construction, at a time convenient to Owner and Architect, but no later than fifteen (15) days after execution of the Agreement.
- B. Attendees: Participants are to be familiar with the project and authorized to conduct matters related to the Work and project. Attendees include representatives of the following:
 1. Owner and others that may be designated by Owner.
 2. Architect.
 3. Architect's Consultants.
 4. Contractor Project Manager and On-Site Superintendent.
 5. Major Subcontractors.
 6. Major Suppliers.
 7. Commissioning Authority (if commissioning is required for project).
 8. Relevant Utility Providers.
 9. Relevant Regulatory Agencies Having Jurisdiction.
- C. Agenda: Discuss items of significance that could affect progress and quality of the Work, including the following:
 1. Designation of key personnel and their duties.

2. Identification of Contractor's Safety Officer.
3. Lines of communications.
4. Status of Owner-Contractor Agreement, Bonds and Insurance Certificates.
5. Status of Building Permits.
6. Distribution of the Contract Documents.
7. Owner's occupancy requirements.
8. Limits of construction areas and restrictions for environmentally protected areas.
9. Restrictions regarding on-site presence of firearms and use of tobacco products.
10. Working restrictions.
11. Working hours.
12. Tentative construction schedule, including Contract Start Date, Contract Milestones and Contract Completion Date.
13. Procedures for processing field decisions and Change Orders.
14. Procedures for RFIs.
15. Procedures for testing and inspecting.
16. Commissioning activities (if commissioning is required for project).
17. Procedures for processing Applications for Payment.
18. Submittal schedule and procedures.
19. Critical work sequencing and long-lead items.
20. Responsibility for temporary facilities and controls.
21. Procedures for moisture and mold control.
22. Construction waste management and recycling.
23. Office, work, parking, staging and storage areas.
24. Equipment deliveries and priorities.
25. On-Site and Site Access Traffic Control.
26. Protocol for emergency events and first aid.
27. Security.
28. Progress cleaning.
29. Procedures for maintaining Contractor as-built drawings and specifications documentation.
30. Project closeout and submission of closeout items and record documents.

3.7 SITE MOBILIZATION MEETING

- A. Contractor is to schedule and conduct a Site Mobilization Meeting before Contractor occupancy of site. If Owner and Contractor agree, meeting may be conducted jointly within the Preconstruction Meeting.
- B. Attendees: Participants are to be familiar with the project and authorized to conduct matters related to the Work and project. Attendees include representatives of the following:
 1. Owner and others that may be designated by Owner.
 2. Architect.
 3. Contractor Project Manager and On-Site Superintendent.
 4. Major Subcontractors.
 5. Commissioning Authority (if commissioning is required for project).
 6. Relevant Utility Providers, (if services required during mobilization).
 7. Relevant Regulatory Agencies Having Jurisdiction.
- C. Agenda: Discuss items of significance and including the following:
 1. Mobilization schedule.
 2. Use of premises by Owner and Contractor.
 3. Owner requirements.
 4. Site access.
 5. Erosion control including measures at site entrances.
 6. Construction facilities and controls.

7. Temporary utilities.
8. Survey and building layout.
9. Security and housekeeping procedures.
10. Procedures for testing.
11. Procedures for maintaining Contractor as-built (record) drawings and specifications documentation.
12. Requirements for start-up of equipment.
13. Inspection and acceptance of equipment put into service during construction period.

3.8 PROGRESS MEETINGS

- A. Contractor is to schedule and conduct Progress Meetings throughout progress of the Work at regularly scheduled interval as follows:
 1. Once monthly.
- B. Attendees: Participants are to be familiar with the project and authorized to conduct matters related to the Work and project. Attendees include representatives of the following:
 1. Owner and others that may be designated by Owner.
 2. Architect.
 3. Architect's Consultants.
 4. Contractor's Project Manager and On-Site Superintendent.
 5. Other relevant parties involved or concerned with current Work progress, or involved in planning, coordination, or performance of future activities. Depending on scheduled activities and phase of Work types, such parties may include the following:
 - a. Major Subcontractors.
 - b. Major Suppliers.
 - c. Commissioning Authority (if commissioning is required for project).
 - d. Relevant Utility Providers.
 - e. Relevant Regulatory Agencies Having Jurisdiction.
- C. Agenda: Include topics for discussion as appropriate to status of Project.
 1. Review and correct or approve minutes of previous progress meeting.
 2. Review of Work progress.
 - a. Review pertinent videos/photographs of the Work.
 - b. Review construction schedule and completion.
 - c. Review corrective action planned to recover activities that are behind schedule.
 - d. Review planned progress during succeeding work period.
 - e. Coordination of projected progress.
 3. Review Owner provided work and items.
 4. Field observation reports.
 5. Status of corrections to deficient Work.
 6. Progress cleaning.
 7. Identification of problems that impede, or will impede, planned progress.
 8. Review status of submittals, requests for information, supplemental information, change proposals, change orders and pending claims/disputes.
 9. Maintenance of quality and work standards.
 10. Effect of proposed changes on construction schedule and coordination.
 11. Other contract related activities.
- D. Drone Aerial Flight Video: For each Progress Meeting, Contractor is to produce and provide for viewing, an aerial video of the project indicating progress, status, and pertinent aspects of the Work. Video is to be produced from a choreographed camera-equipped drone flight, produced no more than two (2) days prior to the Progress Meeting. The video is to be used at each meeting in conjunction with specific area photographs to provide an overview of the

project status and progress. Video is to be uploaded to the EDMS for archive and viewing by Owner, Architect, and Architect's consultants.

3.9 PRE-INSTALLATION MEETINGS

- A. Contractor is to schedule and conduct pre-installation meetings at project site prior to commencing Work of specific section. Work requiring pre-installation meeting is indicated in individual specification sections.
- B. Require attendance of parties directly affecting, or affected by, Work of specific section.
- C. Notify Owner and Architect seven (7) days in advance of meeting date.
- D. Prepare agenda and conduct meeting:
 - 1. Review conditions for installation, preparation, and installation procedures.
 - 2. Review coordination with related and adjacent work.

3.10 CLOSEOUT MEETING

- A. Contractor is to schedule and conduct Project Closeout Meeting sufficiently advanced in time to prepare for requesting Substantial Completion Inspection.
- B. Attendees: Participants are to be familiar with the project and authorized to conduct matters related to the Work and project. Attendees include representatives of the following:
 - 1. Owner and others that may be designated by Owner.
 - 2. Architect.
 - 3. Architect's Consultants.
 - 4. Contractor Project Manager and On-Site Superintendent.
 - 5. Commissioning Authority (if commissioning is required for project).
 - 6. Others appropriate to closeout matters.
- C. Agenda: Items to review include, but are not limited to, the following:
 - 1. Review Section 01 77 00 - Closeout Procedures.
 - 2. Contractor's inspection of Work.
 - 3. Start-up of facilities and systems.
 - 4. Commissioning of Work and systems (if commissioning is required for project).
 - 5. Testing, adjusting, and balancing.
 - 6. System demonstration and training for Owner.
 - 7. Inspections by authorities having jurisdiction.
 - 8. Final surveys.
 - 9. Certificate of Occupancy from Authority Having Jurisdiction.
 - 10. Transfer of insurance responsibilities.
 - 11. Final cleaning.
 - 12. Closeout Submittals: Including, but not limited to, the following:
 - a. Project Record Documents.
 - b. Architect's and Owner's disposition regrading approved physical samples.
 - c. Operating and Maintenance Manuals.
 - d. Warranties Manual.
 - e. Spare parts, special tools, operating, maintenance, and extra stock materials.
 - f. Keys.
 - g. Affidavits.
 - 13. Contractor preparation and distribution of Contractor's comprehensive punch list.
 - 14. Procedure to request Architect inspection to determine date of Substantial Completion.
 - 15. Completion time for correcting deficiencies.
 - 16. Partial release of retainage.
 - 17. Preparation for final inspection.

18. Final Application for Payment package components including affidavits and other require documents.
19. Contractor's demobilization from Site.
20. Archiving and submittal of data using the Contractor provided Electronic Documents Management Service (EDMS).
21. Maintenance.

END OF SECTION

SECTION 01 31 26
ELECTRONIC COMMUNICATION PROTOCOLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Electronic Document Management Service (EDMS).

1.3 DEFINITIONS

- A. Digital Media Device: Digital media drive device, readable with current Microsoft operating system software.
- B. EDMS: Electronic Document Management Service. EDMS is a system for electronic document management, control, and communications between the Contractor, Owner, Architect, Architect's consultants, and other project-related consultants approved by the Owner.
- C. PDF: Portable Document Format electronic file.
- D. Post: To transmit, upload or submit, data or documents to the EDMS for the purposes of review, review actions, record maintenance, logging, documentation, or other reasons for making the information available for remote access electronically.

1.4 SUBMITTALS

- A. Product Data: A minimum of five (5) days prior to the Preconstruction Meeting, submit data describing the EDMS. Include information regarding the navigation dashboard and various logs; notification features; procedures regarding upload of files, data, and review actions; log types; accessibility; archive download procedures and navigation functionality of the archive product; video illustrating basic features and usage; and user instruction manual.

1.5 CLOSEOUT SUBMITTALS

- A. After project acceptance and prior to final payment, submit a digital archive of the EDMS in accordance with requirements indicated in the DIGITAL ARCHIVE article in this Section.

1.6 COORDINATION

- A. At the Preconstruction Meeting, Contractor is to provide to Owner and Architect a list of persons (users) Contractor will be providing access to and usage of the EDMS. List is to include user's name, company name, trade, email address, phone number and purpose for providing user access to EDMS. At minimum, this will include the Contractor's Project Manager, Superintendent(s) and other technical staff as required. These personnel shall have sufficient computer skills required to access, use, and troubleshoot the Contractor provided EDMS. Within the list, identify the Contractor's primary and secondary persons that users are to contact with questions and requests regarding the EDMS.
 - 1. Owner and Architect will follow-up by providing Contractor with list of persons and consultants whose rolls will require access to and usage of the EDMS.

PART 2 PRODUCTS

2.1 ELECTRONIC DOCUMENT MANAGEMENT SERVICE (EDMS)

- A. "PROCORE" project management software application.

PART 3 EXECUTION

3.1 ELECTRONIC DOCUMENT MANAGEMENT SERVICE (EDMS)

- A. The Contractor is to provide an Electronic Document Management Service (EDMS) for electronic construction management document control and communications between the Contractor, Owner, Architect, and other project-related consultants. Unless otherwise designated by the Owner, the system will be maintained and owned by the Contractor, but operated collaboratively by the approved users. The EDMS that the Contractor provides must be approved by the Owner and Architect. The Contractor is responsible for providing training for all approved users on how to use the EDMS at no additional costs to the Contract.
- B. The Contractor is to work collaboratively with the Architect to set up and configure the EDMS system to set up project folders and access consistent with the Architect's desired project management structure.
- C. The Contractor is primarily responsible for the scanning, uploading, and logging of all electronic documents for the project.
- D. The Contractor is to provide sufficient personnel and equipment as required by its staff, subcontractors, suppliers, etc., to electronically submit and upload all necessary documents. This requirement includes personnel and equipment as required for field/jobsite execution.
- E. Project Management Software Application(s):
 - 1. Provide web-based EDMS for digital access to current project management information associated with the project, including, but not limited to, the following:
 - a. Submittals, Shop Drawings, and Samples.
 - b. Requests for Information.
 - c. Designer Supplemental Instructions.
 - d. Requests for Proposals.
 - e. Change Proposals.
 - f. Change Orders and Allowance Disbursement Documentation.
 - g. Meeting Reports.
 - h. Agency Reports.
 - i. Safety Logs.
 - j. Applications for Payment.
 - k. Monthly Weather Reports.
 - l. Deficiency Reports.
 - m. Designer Field Observation Reports.
 - n. Punch Lists.
 - o. Construction Documents.
 - p. Specifications.
 - q. Project Drawings.
 - r. Progress Schedules.
 - s. Project Photographs and Videos.
 - t. Contractor's Building Information Model (BIM).
 - u. Other documentation as may be required by Architect or Owner.
 - v. Other pertinent information associated with the Contract Documents.

- w. Project Closeout Documents: Digital version (duplication) of required closeout documentation. This digital version archive does not relieve Contractor from providing all physical paper copy and manual submissions of closeout documentation indicated in the Contract Documents.
 2. The Contractor shall provide adequate programming expertise to organize and manage the EDMS program and contents.
- F. Documents posted are to be in PDF format and posted to EDMS that receives, logs and stores documents; provides for review processing and markup actions; electronic action stamping and signatures; and provides email notifications to responsible parties of posted documents available and requiring actions of responsible parties in the work-flow sequence.
1. Establish the types and categories of documentation (logs) that will be maintained on the web-based submittal service. Logs will include those indicated in this Section and other logs may be added as may be required by the Architect or Owner.
 2. It is Contractor's responsibility to submit documents in PDF format.
 3. Contractor, Subcontractors, Suppliers, Owner, Architect and Architect's consultants are to be permitted to use the submittal service at no extra charge.
 4. Users of the project management software need an email address, internet access, and PDF review software that includes ability to mark-up and apply electronic action stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the submittal service provider.
 5. Submitted paper documents and emailed documents will not be reviewed unless Architect has pre-approved, in writing, that select and specific submittals are to be submitted in a manner other than the EDMS. In such case of Architect's written approval, the submitted documents and review results are still to be documented by Contractor in proper sequence within the EDMS as a matter of record.
 6. In the case of submissions of physical samples for product characteristic selections (e.g. colors, finishes and other characteristics), the items are to be physically shipped to the required recipient and, on the same day, Contractor is to upload a detailed description of the items and Contractor's review actions to the appropriate EDMS log for tracking and documentation purposes. Same-day EDMS logging and physical shipping is important for accuracy of tracking.
 7. Cost: The cost of the EDMS is to be paid by Contractor.
 - a. Contractor to pay all licensing and access fees, and distribute the required software for individual access to the following:
 - 1) Owner's Representatives (3 persons).
 - 2) Architect (3 persons).
 - 3) Architect's Structural Consultant (2 persons).
 - 4) Architect's MEP/FP Consultant (4 persons).
 - 5) Architect's Civil/Site Consultant (2 persons).
 - 6) Technology Consultant (2 persons).
 - 7) Architect's Kitchen Equipment Consultant (1 person).
 - 8) Commissioning Authority (1 person).
 - 9) Others that may be required by Architect or Owner (3 persons).
 - b. Contractor to acquire email addresses from proposed users for the purpose of establishing user access and usability.
 8. Training: Contractor to provide, schedule and participate in a two (2) hour, web-based training session for all users; further training is the responsibility of the individual user of the service.

3.2 DIGITAL ARCHIVE

- A. After Project Completion and prior to Final Payment, submit a digital archive of the historical documentation maintained on the EDMS to Owner and Architect for their separate records.
1. Prior to digital archive download process:
 - a. Verify that logs are complete with all final documents and reviews having been uploaded.
 - b. Coordinate with the Architect and Owner to verify that the documentation is ready for archiving process.
 - c. Do not terminate the Owner's and Architect's user access to the EDMS until verification that both have received the fully operational digital archive.
 2. Coordinate with EDMS technical support to acquire comprehensive download of digital archive files, logs and navigational portal (dashboard).
 3. Submission Format: Digital Media Device.
 - a. Label digital media device to include Owner name, project name, Owner's project number, Contractor's name and contact information, Architect company name, EDMS company name and contact information, date and time the archive was downloaded, and list of logs included on digital media device.
 - b. Digital archive shall include a HTML file that provides a navigation portal (dashboard) that operates and appears the same as did the web-based service user portal. The navigation portal shall include a hyperlinked list of all logs for Activity Summary view and Full Log view and shall include hyperlinks to view the Project Team view and Event History view. The views for each of the logs shall include viewing windows, with hyperlinks to the documentation files, as it appeared in the respective log views on the web-based service.
 - c. Digital archive shall include all documentation, data, hyperlinks, and navigational portal to operate on a PC based system and without additional applications, software, or internet access.
 4. Submit the digital archive to the Owner and Architect and verify that each digital archive is operating properly prior to termination of the EDMS. Acquire written approval from Owner for termination of the EDMS.

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - a. Startup Construction Schedule.
 - b. Contractor's Construction Schedule.
 - c. Schedule Updating.
 - d. Daily Construction Reports.
 - e. Site Condition Reports.
- B. Related Requirements:
1. Division 01 Section "Administrative Requirements".

1.3 DEFINITIONS

- A. Activity: A distinct part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 2. Predecessor Activity: An activity that precedes another activity in the network.
 3. Successor Activity: An activity that follows another activity in the network.
- B. Contract Start Date: The date of Commencement of the Work as established by the provisions of the Contract.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.4 INFORMATIONAL SUBMITTALS

- A. All schedules, reports, and submittals to be uploaded to the Contractor provided Electronic Documents Management Service (EDMS) at times indicated.
 - 1. Refer to Division 01 Sections “Administrative Requirements” and “Electronic Communication Protocols” regarding EDMS.
- B. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file.
 - 2. PDF electronic file.
 - 3. Color paper copy where hard copy indicated.
- C. Startup Construction Schedule.
 - 1. For scheduling that requires cost-loaded activities, the Startup Construction Schedule will not constitute approval of schedule of values for cost-loaded activities.
- D. Contractor's Construction Schedule: Submit as indicated in the CONSTRUCTION SCHEDULE article of this Section.
- E. Construction Schedule Updating Reports: Submit as indicated in the CONSTRUCTION SCHEDULE article of this Section.
- F. Daily Construction Reports: Maintain on site; to be submitted upon request from Owner or Architect.
- G. Site Condition Reports: Submit at time of discovery of differing site conditions.

1.5 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or consultant specializing in CPM scheduling with five (5) years minimum experience in scheduling construction work of complexity comparable to this Project and having use of computer facilities capable of delivering detailed graphic printout and electronic upload within 48 hours of request.
- B. Contractor's Administrative Personnel: Two years minimum experience in using and monitoring CPM schedules on comparable projects.

1.6 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.7 SCHEDULING REQUIREMENTS

- A. Time Frame:
 - 1. Extend schedule from Contract Start Date to Date of Substantial Completion.
 - a. Further extend schedule to indicate activities required from Substantial Completion to Final Completion.
 - b. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Network Analysis Diagrams: Prepare diagrams using activity-on-node (AON) format.
- C. Use "one day" as the unit of time for individual activities. Indicate nonworking days and holidays scheduled within the Contract Time.

- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Prepare a network analysis diagram to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include, without limitation, the following activities with estimated time durations:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - 1) Installation durations exceeding 21 days are to be divided into multiple activities as logical construction portions of installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and commissioning.
 - 1) Provide sufficient duration for testing and certification of commissioning requirements to be completed prior to Substantial Completion.
 - j. Inspections by Authorities Having Jurisdiction.
 - k. Certificate of Occupancy.
 - l. Closeout Activities.
 - m. Preparation and submittal of closeout and record documents.
 - n. Substantial Completion Inspection.
 - o. Certification of Substantial Completion.
 - p. Completion of incomplete Work and deficiencies.
 - q. Final Inspection.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start - total float". Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediately preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in days.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).

- G. Schedule Updating: Concurrent with revising the schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in days.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 STARTUP CONSTRUCTION SCHEDULE

- A. Within ten (10) days of the Contract Start Date, Contractor is to prepare and submit Startup Construction Schedule, including network diagram. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
1. Submit updated startup construction schedule with each Application for Payment.
 2. Submit number of opaque reproductions Contractor requires, plus two copies Architect will retain.

3.2 CONSTRUCTION SCHEDULE

- A. Prepare and submit Contractor's Construction Schedule, including a time-scaled CPM network analysis diagram for the Work.
- B. Within thirty (30) days of the Contract Start Date, prepare and submit a draft of proposed Contractor's Construction Schedule for review. Include written certification that major subcontractors have reviewed and accepted proposed schedule.
1. Submit number of paper color reproductions Contractor requires, plus two copies Architect will retain.
- C. Within fifty (50) days of the Contract Start Date, prepare and submit the final Contractor's Construction Schedule including completed network analysis consisting of network diagrams and mathematical analysis. Include written certification that major subcontractors have reviewed and accepted proposed schedule.
1. Submit number of paper color reproductions Contractor requires, plus two copies Architect will retain.
- D. Failure to include any work item required for performance of the Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's or Owner's review of the schedule.
- E. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
- F. Establish procedures for monitoring, recording progress and updating Contractor's Construction Schedule.
- G. Construction Schedule Updating Reports: At monthly intervals, update schedule to reflect actual construction progress and activities. Submit updated schedule one week before each project Progress Meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Submit updated schedule concurrently with the report of each such meeting and include updated schedule in submittal of each Application for Payment.
 2. As the Work progresses, indicate final completion percentage for each activity.
- H. Distribution:
1. Submit approved schedule to parties requiring schedule information and to Owner, Architect, testing and inspecting agencies, and other parties identified by Owner.
 2. Post paper color copies in project meeting room(s) and temporary field offices.
 3. When revisions are made, submit updated schedules to the same parties and post in the same locations referenced above.
 4. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.3 REPORTS

- A. Maintain and submit as indicated in this Section.
- B. Daily Construction Reports: Prepare and maintain on site a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. Approximate count of personnel at Project site.
 3. Equipment at Project site.
 4. Material deliveries.
 5. High and low temperatures, general weather conditions and precipitation amounts.
 6. Accidents.
 7. Meetings and significant decisions.
 8. Unusual events.
 9. Stoppages, delays, shortages, and losses.
 10. Emergency procedures.
 11. Orders and requests of authorities having jurisdiction.
 12. Testing scheduled; indicate results and cancelations.
 13. Inspections scheduled; indicated results and cancelations.
 14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Utility services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial completions and occupancies.
 19. Substantial Completion certification.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit as a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative, procedural, and other requirements that include:
1. Submittal Schedule.
 2. Submittal Administrative Requirements.
 3. Submittal Procedures.
 4. Types of Submittals.
 5. Delegated Design Services.
- B. Related Requirements:
1. Division 01 Section "Electronic Communication Protocols".
 2. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including project construction schedule.
 4. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 5. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 6. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals not indicated in individual Specification Sections as "informational submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is for the Contractor to demonstrate the way by which 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.
1. The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and one of the following written authorizations:
 - a. The Architect has given written approval to the specific deviation as a minor change in the Work.

- b. A Change Order or Construction Change Directive has been issued authorizing the deviation.
- 2. 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.
- D. **Contract Start Date:** The date of Commencement of the Work as established by the provisions of the Contract.
- E. **File Transfer Protocol (FTP):** Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users can access files.
- F. **Portable Document Format (PDF):** An open standard file format used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 SUBMITTAL SCHEDULE

- A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate Submittal Schedule with list of subcontracts, the schedule of values, and construction schedule.
 - 2. **Initial Submittal:** Submit concurrently with submittal of the Startup Construction Schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. **Final Submittal:** Submit concurrently with the submittal of Contractor's Construction Schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 4. **Format:** Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action Submittal or Informational Submittal.
 - d. Name of subcontractor and/or supplier.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled date of fabrication.
 - h. Scheduled dates for purchasing.
 - i. Scheduled dates for installation.
 - j. Progress Schedule construction activity description and number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with 01 31 26 - Electronic Communication Protocols regarding electronic submission requirements for submittals indicated in this Section.
- B. Transmit/post each submittal with Architect accepted form.
- C. **Coordination:** Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 5. All submittals requiring color and finish selections will not receive Architect's review action until all such submittals (e.g. material, color, finishes samples and other related requested information) have been received by the Architect.
 - a. Architect will assemble final color board(s) for Owner's approval of exterior and interior materials and color schemes prior to Architect's issuance of review action to Contractor.
- D. Processing Time: Allow time for submittal review, including time for resubmittals. 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. Single Reviewer: Allow 15 days for each review of each submittal, and each resubmittal. 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. Sequential Reviewers: Allow 21 days for each review of each submittal, and each resubmittal when sequential review of submittals by Architect's consultants, Owner, or other parties is required.
 3. Submittals Requiring Color Selection: Coordinate and provide timely submission of all submittals requiring color selection for the project's exterior and interior. Architect's review of such submittals will not be completed until all such submittals are received. The purpose is to promote a fully coordinated color/finish scheme for the overall project. Where color selection charts are allowable for Initial Selection, such materials shall be manufacturer's original printed material.
 4. In submittal log, provide review action column for each required reviewer such as Architect's consultants and other parties. Position the Architect's consultant review action columns in the log prior to the Architect's review action column, reflecting the sequence of reviews.
- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed/bookmarked file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use abbreviated project identifier; hyphen and Specification Section number; hyphen and two-digit sequential number; hyphen and two-digit resubmittal sequential number. (e.g. MBMS-013300-01-00).
 3. Apply Contractor review action stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction

- Work, and coordination of information is in accordance with requirements of the Work, Contract Documents, and the Submittal requirements.
4. Provide means for insertion to permanently record review and approval markings of Contractor and action taken by Architect.
 5. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Architect, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name of Contractor.
 - e. Name of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Related physical samples submitted directly.
 - m. Transmittal number, numbered consecutively.
 - n. Submittal and transmittal distribution record.
 - o. Other necessary identification.
 - p. Remarks.
- F. Options: Identify options requiring selection by Architect.
- G. Deviations: Conspicuously mark deviations, including minor variations and limitations, from the Contract Documents to include an itemization number. On an attached separate sheet, prepared on Contractor's letterhead, record each deviation itemization number and provide an explanation for each deviation and its impact on the Work and the Contract Documents.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- I. 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.
- J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval action stamp from Contractor and Architect.

PART 2 PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Upload/post electronic submittals as PDF electronic files directly to the Contractor provided internet-based submittal service specifically established for Project.

- a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
- B. Product Data: Each element of construction, product, and equipment is to be compiled into a Product Data submittal.
 1. If information must be specially prepared for submittal because standard published data is not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Statement of compliance with specified referenced standards.
 - d. Testing by recognized testing agency.
 - e. Application of testing agency labels and seals.
 - f. Notation of coordination requirements.
 - g. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- D. Samples: Submit actual physical Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. For projects requiring electronic submittals, provide (upload) corresponding electronic version of the physical submittal that is transmitted to Architect. This purpose is to

- provide continuity and completeness of the electronic recording and tracking of project submittals. The electronic upload is to include digital image files of all materials and data (including copy of the transmittal) as was transmitted to Architect. Include digital images of the physical items submitted and the identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 5. Samples for Initial Selection: Submit manufacturer's color charts or samples consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected and retain one sample for record.
 - b. Finish Characteristics Options: Options include ranges of colors, textures, patterns, and other finish appearance characteristics. Contract sum is to include Architect or Owner selections from ranges indicated to be submitted.
 - 1) Full Range: Includes all finish characteristics available except Custom options. Full range includes Standard and Premium finish characteristics.
 - 2) Custom Options: All finish characteristics available and includes Custom finishes.
 6. Samples for Verification: Submit samples of the Architect's initial selection action for the Architect to make final selection action. Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: Partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned to Contractor.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- F. Comply with requirements indicated in the Contract Documents regarding the following:
1. Coordination Drawing Submittals.
 2. Contractor's Construction Schedule.
 3. Application for Payment and Schedule of Values.
 4. Test and Inspection Reports and Schedule of Tests and Inspections Submittals.

5. Closeout Submittals and Maintenance Material Submittals.
 6. Maintenance Data.
 7. LEED and/or Other Sustainable Design Submittals.
- G. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- H. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- I. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- J. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- K. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- L. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- M. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- N. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- O. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
 2. Date of evaluation.
 3. Time period when report is in effect.
 4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
- P. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- Q. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

- R. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- S. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- T. Other Submittal Requirements: Include requirements indicated in specific Sections.

2.2 DELEGATED DESIGN SERVICES

- 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 Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 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.
 - 2. The responsible design professional shall be licensed to provide the related design services in the State in which the project is located.

PART 3 EXECUTION

3.1 REVIEW AND ACTION

- A. Contractor's Review:
 - 1. Action and Informational Submittals: 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. For submittals that are compliant with the contract requirements, mark with approval stamp before submitting to Architect.
 - a. If project is being constructed by Construction Manager delivery, contractors and subcontractors are to submit submittals to Construction Manager. Construction Manager is to complete its review approval prior to submitting to Architect.
 - 2. Project Closeout and Maintenance Material Submittals: See requirements in Division 01 - General Requirements regarding project closeout and maintenance material submittals.
 - 3. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval indicating and certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
- B. Architect Review:

1. **Action Submittals:** Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action. The Architect will review and approve, or take other appropriate action upon, 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. 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 submittals shall not relieve the Contractor of compliance with the requirements of the Contract Documents. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, 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.
2. **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.
3. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review. Submittals that are not marked as approved by the Contractor are incomplete submittals.
4. Submittals not required by the Contract Documents may be returned by the Architect without action.
5. Architect requires all exterior and interior material color samples to be submitted prior to final approval of color choices on the project. Exterior color samples will be reviewed and approved separately from interior color samples. Contractor must review all color sample submittal format and requirements to avoid resubmittals. Delays due to the failure to procure and submit color samples is the responsibility of the Contractor.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
1. Specific quality assurance and quality control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and quality control procedures that facilitate compliance with the Contract Document requirements.
 3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Requirements:
1. Division 01 Section "Allowances" for testing and inspecting allowances.
 2. Divisions 03 through 33 Sections for specific test and inspection requirements.

1.3 REFERENCES

- A. Referenced Standards: For products or workmanship specified by reference to a document or documents not included in the Project Manual, comply with requirements of the standard, except when more rigid and/or stringent requirements are specified or are required by applicable codes. Such specified exceptions and applicable codes do not nullify requirement for compliance with other requirements within the referenced standard. Documents referred to are product or workmanship standards established by and published by Associations, Trades, Organizations, or other groups that establish consensus quality standards.
- B. Issuance Date of Reference Standards: Comply with reference standard by date of issue current on date of Contract Documents, except where specific date is established by applicable code. Issuance date is also known as edition date or version date.
1. Reapproved and Reapproval Dates: Comply with all the changes, amendments, modifications, and other such requirements established as part of the reapproved Reference Standard.
- C. When specified reference standard conflicts with Contract Documents, request clarification from Architect before proceeding.
- D. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in reference standard documents.

1.4 CONFLICTING REQUIREMENTS

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

1.5 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum number (as indicated in individual specification sections) of previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
 - 2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

- G. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- H. Source Quality Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- I. Field Quality Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- J. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality Control Plan: For quality assurance and quality control activities and responsibilities.
- B. Qualification Data: For Contractor's quality control personnel.
- C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality control service.

1.7 QUALITY CONTROL PLAN

- A. Contractor's Quality Control Plan: Submit quality control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality assurance and quality control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality assurance and quality control procedures similar in nature and extent to those required for Project.
 - 1. Project quality control manager shall not have other Project responsibilities.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.

2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
 3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

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

3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 TESTING AND INSPECTION SERVICES

- A. Owner will employ and pay for specified services of an independent firm to perform testing and inspection unless noted otherwise.
- B. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Owner or Architect.
1. Laboratory: Authorized to operate at Project location.
 2. Laboratory Staff: Maintain full time registered Engineer on staff to review services.
 3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- C. Testing, inspections, and source quality control may occur on or off project site. Perform off-site testing as required by Owner or Architect.
- D. Reports will be submitted by independent firm to Owner, Contractor and Architect in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents. Also, independent firm will submit reports to Authorities Having Jurisdiction (AHJ) when required by AHJ's.
1. Submit final report indicating correction of Work previously reported as non-compliant.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
1. Notify Architect and independent firm 24 hours prior to expected time for operations requiring services.
 2. Make arrangements with independent firm and pay for additional samples and test required for Contractor's use.
- F. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements on Contract Documents.
- G. Contractor is to monitor costs incurred for testing and inspections services by the Owner's hired third-party entity(s). When project Work is 75 percent complete, provide written notification to Owner and Architect indicating the following:
1. Percentage of project Work completed.
 2. Total amount Owner has incurred for testing and inspection services to date.
 3. List of additional testing and inspections Contractor expects to be required, along with estimated costs, for completion of the project Work.
- H. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Owner or Architect. Payment for re-testing or re-inspections will be charged to Contractor by deducting testing charges, and other costs directly related to re-testing or re-inspection, from Contractor's Contract Sum/Price.
- I. Agency Responsibilities:

1. Test samples of mixes submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Owner, Architect and Contractor of observed irregularities or non-conformance of Work products.
 6. Perform additional tests required by Owner or Architect.
 7. Attend preconstruction meetings and progress meetings.
- J. Agency Reports: After each test or inspection, promptly submit reports by way of electronic or hard-copy transmission to Owner, Contractor and Architect. Also, submit reports to Authorities Having Jurisdiction (AHJ's) when required by AHJ's. Reports are to include the following:
1. Date issued.
 2. Project title and number.
 3. Name of inspector.
 4. Date and time of sampling or inspection.
 5. Identification of product, specifications section and other related Contract requirements.
 6. Location in Project.
 7. Type of inspection or test.
 8. Date of test.
 9. Results of test.
 10. Conformance with Contract Documents.
 11. When requested by Owner or Architect, provide a more detailed interpretation of test or inspection results.
- K. Limits On Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency or laboratory may not approve or accept any portion of the Work.
 3. Agency of laboratory may not assume duties of Contractor.
 4. Agency or laboratory has no authority to stop the Work.

1.10 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those

- performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections may require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Labeling: Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
1. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - a. Model number.
 - b. Serial number.
 - c. Performance characteristics.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
 2. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven (7) days for initial review and each re-review of each mockup.
 6. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Where mockup has been accepted by Architect and is specified in product specification sections to be removed; remove mockup and clear area when directed to do so by Architect.

1.11 QUALITY CONTROL

- A. Owner Responsibilities: Where explicitly indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform quality control services including, but not limited to, tests and inspections.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Where not explicitly indicated as Owner's responsibility, Contractor will engage a qualified testing agency to perform quality control services including, but not limited to, tests and inspections. Also, Contractor is to perform additional quality control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality control services specified and those required by authorities having jurisdiction. Perform quality control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Owner, Architect, Commissioning Authority, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- G. Tolerances: Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
1. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
 2. Adjust products to appropriate dimensions; position before securing products in place.
- H. Quality Control of Work and Installation: Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
1. Comply with manufacturers' instructions, including each step, in sequence.
 2. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
 3. 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.
 4. Perform Work by persons qualified to produce required and specified quality.
 5. Verify field measurements prior to fabrication of products.
 6. Verify field measurements are as required prior to beginning installation of Work.
 7. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
- I. Coordination: Coordinate sequence of activities to accommodate required quality assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
- J. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 TEST AND INSPECTION LOG

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

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Cutting and patching requirements are to comply with the Contract Documents.
- B. Protect construction exposed by or for quality control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

3.3 SCHEDULE OF MOCKUPS

- A. Exterior Wall Mockup:
 1. Provide mockup as indicated on Drawings. Mockup construction is to be separate from project final construction and is to be removed from project site after Contractor acquires approval for removal from Architect.
- B. Interior Room Mockup:
 1. Provide mockup of the following room:
 - a. Room: Typical Classroom.
 2. Final schedule and progressive installation of work and finishes for approval to be coordinated between the Architect, Owner, and Contractor. It is not expected that the entire mockup be completed prior to review and approval. The intent is to allow for an incremental assessment of the intended level of workmanship and compliance prior to the overall project installation of the products and finishes as deemed necessary by the Architect.
 3. Mockup requirements are to be installed and approved by the Owner and Architect. Work completed in the room mockup shall be incorporated into the final work upon approval.
 4. Room Mockup Scope:
 - a. All work requirements within the room are to be installed as part of the mockup.

END OF SECTION

SECTION 01 45 00.10
INSPECTION REQUIREMENTS

PART 1 GENERAL

Architect of Record: Robert Ferris, AIA REFP, LEED AP – SfL+a Architects, PA
Structural Engineer of Record: Robert E. Lasater, Jr., P.E. – Bennett & Pless, Inc.
Building Official: Harnett County

This Statement of Inspections is submitted as a condition for permit issuance in accordance with the Special Inspection requirements of the 2018 North Carolina State Building Code. It includes a Schedule of Special Inspection Services applicable to this project. The name of the Inspector(s) and the identity of other approved agencies intended to be retained for conducting these inspections will be released by the owner following the bid opening.

The Inspector(s) shall keep records of all inspections and shall furnish inspection reports to the Owner, Structural Engineer, and Architect of Record. A copy of all reports shall be kept on site at the contractor's trailer. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Owner, Structural Engineer and Architect of Record. The Inspections program does not relieve the Contractor of his or her supervision or inspection responsibilities.

The Contractor is responsible for notifications to Inspector and/or other agencies as required at least two days in advance. The Contractor is responsible for all additional costs incurred by failure to meet requirements or pass any/all inspections and/or testing as required in this section.

Interim reports shall be submitted to the Owner, Structural Engineer and Architect of Record.

Interim Report Frequency: Monthly

A Final Report of Inspections documenting completion of all required Special Inspections and correction of any discrepancies should be submitted prior to issuance of a Certificate of Use and Occupancy.

Job Site safety and means and methods of construction are solely the responsibility of the Contractor.

**1.1 Items Requiring NORTH CAROLINA STATE BUILDING CODE CHAPTER 17
Inspections/VERIFICATIONS**

- A. 2018 North Carolina State Building Code required inspections include, but are not limited to, the following:
- 110.3.1 Footing or foundation inspection
 - 110.3.2 Concrete slab or under-floor inspection
 - 110.3.3 Lowest floor elevation
 - 110.3.4 Frame Inspections
 - 110.3.5 Lath or gypsum board inspection
 - 110.3.6 Fire-resistant penetrations

It is appropriate to take special note of the required energy efficiency compliance inspections. Ensuring compliance with ANSI/ASHRAE/IESNA Standard 90.1 – 2004 is a critical part of the inspection process and MUST be specifically addressed. The

American Society of Heating and Air Conditioning Engineers (ASHRAE) is the foremost technical society in the fields of heating, ventilation, air conditioning and refrigeration. ASHRAE Standard 90.1 is an ANSI approved national consensus standard co-sponsored by ASHRAE and the Illuminating Engineering Society of North America (IESNA). The Standard provides minimum energy efficiency requirements for the design and construction of new buildings and new construction in existing buildings. In particular, it applies to new buildings and their systems, building additions and their systems, and new systems and equipment in existing building.

The scope of the requirements of Standard 90.1 covers the design of the building envelope, the lighting systems, HVAC systems and other energy using equipment. For the OSF Approved Inspector, the 90.1 User's Manual is the best available source of information, worksheets and checklists for the purpose of ensuring compliance with Standard 90.1. These forms cannot be reproduced here due to the copyright restrictions. However, the 90.1 User's Manual can be obtained from the American Society of Heating and Air Conditioning Engineers, Incorporated, 1791 Tullie Circle, Atlanta, Georgia 30329. The telephone number is 404-636-8400. On the net they can be reached at ashrae.org.

Specifically, we refer you to the following in the Standard 90.1 User Manual:

1. Building Envelope Compliance Forms, page 5-71;
2. HVAC Compliance Forms, pages 6-79 through 6-80;
3. Service Water Heating Compliance Forms; page 7-17; and
4. Lighting Compliance Forms, page 9-34.

These forms MUST be submitted to OSF at the final review stage. The Chapter 1 inspector shall request these forms be provided at the initial pre-construction meeting. The design professional shall have them available for that meeting.

909.3 Special inspection and test requirements (smoke control systems)

- B. Mechanical Code: M107.1. Required inspections
1. Underground inspection shall be made after trenches or ditches are excavated and bedded, piping installed, and before backfill is put in place.
 2. Rough-in inspection shall be made after the roof, framing, fireblocking and bracing are in place and all ducting and other components to be concealed are complete, and prior to the installation of wall or ceiling membranes.
- C. Plumbing Code: P107.1 Required inspections and testing
1. Underground inspection shall be made after trenches or ditches are excavated and bedded, piping installed, and before any backfill is put in place.
 2. Rough-in inspection shall be made after the roof, framing, fireblocking, firestopping, draftstopping and bracing is in place and all sanitary, storm and water distribution piping is roughed-in and prior to the installation of wall or ceiling membranes.
- D. Electrical Code:
1. Underground inspection shall be made after trenches or ditches are excavated and bedded, conduit installed, and before backfill is placed.
 2. Rough-in inspection shall be made after the roof, framing, fireblocking and bracing are in place and other components to be concealed are complete, and prior to the installation of concealing construction.

- E. National Fire Alarm Code: Section 4.5:
1. The installing contractor shall furnish a written statement stating that the system has been installed in accordance with approved plans and tested in accordance with the manufacturer's published instructions and the appropriate NFPA requirements (Section 4.5.1.2).
 2. This shall be accompanied by the record of completion form (Figure 4.5.2.1) Verification of compliance of the completed installation shall be included in the responsibilities of the Chapter 1 inspector (Section 4.5.2.4).

1.2 ITEMS REQUIRING NORTH CAROLINA STATE BUILDING CODE, CHAPTER 17 SPECIAL INSPECTIONS

- A. 2018 North Carolina State Building Code Chapter 17 requires special inspections including the following items as defined by their respective sections as noted:

IT-1 SPECIAL CASES (Refer to NCBC Section 1705.1.1)

IT-2 STEEL CONSTRUCTION (Refer to Section 1705.2 and the Exception; Table 1705.2.3)

IT-3 CONCRETE CONSTRUCTION (Refer to NCBC Section & Table 1705.3; Ch. 19)

IT-4 MASONRY (Refer to NCBC Section 1705.4)

IT-5 WOOD (Refer to NCBC Section 1705.5)

IT-6 SOILS (Refer to NCBC Table 1705.6 & Section 1705.6)

IT-7 DRIVEN DEEP FOUNDATIONS (Refer to NCBC Section 1705.7)

IT 8 CAST-IN-PLACE DEEP FOUNDATIONS (Refer to NCBC Section 1705.8)

IT 9 HELICAL PILES (Refer to NCBC Sections 1705.9)

IT 10 FABRICATED ITEMS (Refer to NCBC Sections 1705.10 & 1704.2.5)

IT 11 WIND RESISTANCE (Refer to NCBC Sections 1705.11; 1705.11.1 – 1705.11.3; & 1609.3.1)

IT-12 SEISMIC RESISTANCE (Refer to NCBC Sections 1705.12)

IT 13 TESTING FOR SEISMIC RESISTANCE (Refer to Section 1705.13)

IT-14 SPRAYED FIRE-RESISTANT MATERIALS (Refer to NCBC Sections 1705.14)

IT 15 MASTIC AND INTUMESCENT FIRE-RESISTANT COATING 1705.15

IT-16 EXTERIOR INSULATION & FINISH SYSTEM (EIFS)

IT 17 FIRE-RESISTANT PENETRATIONS AND JOINTS (Refer to NCBC Sections 1705.17; 1705.17.1; & 1705.17.2)

IT-18 SMOKE CONTROL (Refer to NCBC Section 1705.18)**1.3 REPORTING SERVICES**

- A. It is the inspectors' responsibility to verify that the contractor conforms to this section of the code. Furthermore, it is vital to understand that mechanical, electrical and plumbing seismic and vibration analysis and inspections are required and must include the seismic protection for electrical raceways, and equipment; plumbing, piping and related equipment; and, seismic protection for mechanical systems.
- B. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect or Owner.
- C. Reports will be submitted by independent firm to Architect, Contractor, and authority having jurisdiction, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
 - 1. Submit final report indicating correction of Work previously reported as non-compliant.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Architect and independent firm 48 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- E. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- F. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
- G. Agency Responsibilities:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
 - 6. Perform additional tests required by Architect.
 - 7. Attend preconstruction meetings and progress meetings.
- H. Agency Reports: After each test, promptly submit two copies of report to Architect, Contractor, and authority having jurisdiction. When requested by Architect, provide interpretation of test results. Include the following:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and specifications section.
 - 6. Location in Project.

7. Type of inspection or test.
 8. Date of test.
 9. Results of tests.
 10. Conformance with Contract Documents.
- I. Limits On Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency or laboratory may not approve or accept any portion of the Work.
 3. Agency or laboratory may not assume duties of Contractor.
 4. Agency or laboratory has no authority to stop the Work.

1.4 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. Submit qualifications of observer to Architect 30 days in advance of required observations.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to Section 01 33 00 - Submittal Procedures, MANUFACTURERS' FIELD REPORTS article.

1.5 PRODUCTS

Not Used.

1.6 EXECUTION

Not Used.

STATEMENT OF SPECIAL INSPECTIONS

Project: Lillington-Shawtown ES Addition
Location: Lillington, NC
Owner: Harnett County Schools

Design Professional in Responsible Charge: Robert Ferris, AIA, LEED AP
Structural Engineer of Record: Robert E. Lasater, Jr., P.E. - Bennett & Pless, Inc.

This Statement of Special Inspections is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code. It includes a schedule of Special Inspection services applicable to this project as well as the name of the Special Inspection Coordinator and the identity of other approved agencies to be retained for conducting these inspections and tests. This Statement of Special Inspections encompass the following disciplines:

- [X] Structural [X] Mechanical/Electrical/Plumbing
[X] Architectural [] Other:

The Special Inspection Coordinator shall keep records of all inspections and shall furnish inspection reports to the Owner and the Registered Design Professional in Responsible Charge. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Owner and the Registered Design Professional in Responsible Charge. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Owner and the Registered Design Professional in Responsible Charge.

A Final Report of Special Inspections documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

Interim Report Frequency: WEEKLY or [] per attached schedule.

Prepared by:
(type or print name)

Signature Date

Design Professional Seal

Owner's Authorization: Building Official's Acceptance:
Signature Date Signature Date

SCHEDULE OF INSPECTION AND TESTING AGENCIES

This Statement of Special Inspections / Quality Assurance Plan includes the following building systems:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Soils and Foundations | <input type="checkbox"/> Spray Fire Resistant Material |
| <input checked="" type="checkbox"/> Cast-in-Place Concrete | <input checked="" type="checkbox"/> Special Inspections for Wind Resistance |
| <input type="checkbox"/> Precast Concrete | <input type="checkbox"/> Exterior Insulation and Finish System |
| <input checked="" type="checkbox"/> Masonry | <input checked="" type="checkbox"/> Mechanical & Electrical Systems |
| <input checked="" type="checkbox"/> Structural Steel | <input checked="" type="checkbox"/> Architectural Systems |
| <input type="checkbox"/> Cold-Formed Steel Framing | <input checked="" type="checkbox"/> Seismic Requirements |
| <input checked="" type="checkbox"/> Retaining Walls Taller than 5' | <input type="checkbox"/> Other |
| <input type="checkbox"/> Deep Foundations | |

Special Inspection Agencies	Firm	Address, Telephone, e-mail
1. Special Inspections	<i>SI</i>	<i>OWNER TO PROVIDE</i>
2. Structural Engineer of Record	<i>Bennett & Pless Robert E. Lasater</i>	<i>5430 Wade Park Blvd, Suite 400 Raleigh, NC 27607 919.832.5587 blasater@bennett-pless.com</i>
3. Testing Laboratory	<i>ITL</i>	<i>OWNER TO PROVIDE</i>
6. Other		

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner’s Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official, prior to commencing work.

QUALITY ASSURANCE PLAN**Quality Assurance for Seismic Resistance**

Seismic Design Category *C*

Quality Assurance for Wind Requirements

Basic Wind Speed (3 second gust) *125 mph*

Wind Exposure Category *C*

Statement of Responsibility

Each contractor responsible for the construction of a main wind- or seismic-force-resisting system, designated seismic system or a wind- or seismic-resisting component listed in the statement of special inspections shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:

- a. Acknowledgment of awareness of the special requirements contained in the statement of special inspections;
- b. Acknowledgment that control will be exercised to obtain conformance with the construction documents approved by the building official;
- c. Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports; and
- d. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

SCHEDULE OF SPECIAL INSPECTIONS**Legend**

ITL - Inspections Testing
Laboratory

SER - Structural Engineer of
Record

SI - Special Inspections

IT-# - Inspection Type

C - Continuous Special
Inspections

P - Periodic Special
Inspections

IT-1 SPECIAL CASES (Refer to NCBC Section 1705.1.1)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Construction materials and systems that are alternatives to materials and systems prescribed by the 2012 NCBC.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.1.1, #1	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unusual design applications of materials described in the 2012 NCBC.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.1.1, #2	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained in this code or in standards referenced by this code.			NCBC 1705.1.1, #3	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Special Events (as decided / required by Code Enforcement).	<input type="checkbox"/>	<input type="checkbox"/>	Local Authority Having Jurisdiction	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Retaining Walls.	<input type="checkbox"/>	<input type="checkbox"/>		

IT-2 STEEL CONSTRUCTION (Refer to Section 1705.2 and the Exception; Table 1705.2.3)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Structural Steel.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	AISC 360	NCBC 1705.2.1 & Exception
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cold-formed Steel Deck.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDI QA/QC	NCBC 1705.2.2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Open-web Steel Joists and Joist Girders.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		NCBC 1705.2.3 & Table
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Installation of open-web steel joists and joist girders. a. End connections - welding or bolted.		<input checked="" type="checkbox"/>	SJI specifications listed in Section 2207.1	
			b. Bridging - horizontal or diagonal.				
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	i. Standard bridging.		<input checked="" type="checkbox"/>	SJI specifications listed in Section 2207.1	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ii. Bridging that differs from the SJI specifications listed in Section 2207.1		<input checked="" type="checkbox"/>		Uplift Bridging
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cold-formed steel trusses spanning 60 feet or greater		<input type="checkbox"/>		NCBC 1705.2.4

IT-3 CONCRETE CONSTRUCTION (Refer to NCBC Section & Table 1705.3; Ch. 19)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Inspect reinforcement, including pre-stressing tendons and verify placement.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ACI 318 Ch 20, 25.2, 25.3, 26.6.1 – 26.76.3; & NCBC 1908.4	

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Reinforcing Bar welding: a. Verify weldability of reinforcing bars other than ASTM A706. b. Inspect single-pass fillet welds, maximum 5/16". c. Inspect all other welds.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	AWS D1.4; ACI 318:26.6.4	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Inspect anchors cast in concrete.		<input checked="" type="checkbox"/>	ACI 318: 17.8.2	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Inspect anchors post-installed in hardened concrete members. a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads. b. Mechanical anchors and adhesive anchors not defined in 4.a.	<input checked="" type="checkbox"/>		ACI 318: 17.8.2.4 ACI 318: 17.8.2	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. Verify use of required design mix.		<input checked="" type="checkbox"/>	ACI 318: Ch. 19, 26.4.3, 26.4.4, NCBC 1904.1, 1904.2. 1908.2, 1908.3	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	<input checked="" type="checkbox"/>		ASTM C 172; ASTM C 31; ACI 318: 26.4, 26.12	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	7. Inspect concrete and shotcrete placement for proper application techniques.	<input type="checkbox"/>		ACI 318: 26.5, NCBC 1908.6, 1908.7. 1908.8	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8. Verify maintenance of specified curing temperature and techniques		<input checked="" type="checkbox"/>	ACI 318: 26.5.3-26.5.5 NCBC 1908.9	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Inspect of pre-stressed concrete for: a. Application of pre-stressing forces; and b. Grouting of bonded pre-stressing tendons.	<input type="checkbox"/>	<input type="checkbox"/>	ACI 318: 26.10	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Inspect erection of precast concrete members		<input type="checkbox"/>	ACI 318: Ch. 26.8	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Verify in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.		<input type="checkbox"/>	ACI 318: 26.11.2	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12. Inspect formwork for shape, location and dimensions of the concrete members being formed.		<input checked="" type="checkbox"/>	ACI 318:26.11.1.2(b)	

IT-4 MASONRY (Refer to NCBC Section 1705.4)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Masonry Construction.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TMS 402/ ACI 530/ ASCE 5 and TMS 602/ACI 530.1/ASCE 6,	See NCBC 1705.4 Exceptions
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Empirically designed masonry (per 2109), glass unit masonry (per 2110) or masonry veneer (per Ch 14) in Risk Category IV.	<input type="checkbox"/>	<input type="checkbox"/>	TMS 402/ ACI 530/ ASCE 5, Level B Quality Assurance	

IT-5 WOOD (Refer to NCBC Section 1705.5)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prefabricated wood structural elements and assemblies to be in accordance with the requirements set forth in NCBC Section 1704.2.5.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1704.2.5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	High Load Diaphragms.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.5.1 & 1704.2	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temp & permanent bracing on metal-plate-connected trusses spanning ≥ 60 ft.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.5.2	

IT-6 SOILS (Refer to NCBC Table 1705.6 & Section 1705.6)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Verify materials below shallow foundation are adequate to achieve the design bearing capacity.		<input checked="" type="checkbox"/>	NCBC 1705.6; geotechnical report & construction documents from RDPIRC	See NCBC 1705.6 exception
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Verify excavations are extended to proper depth and have reached proper material.		<input checked="" type="checkbox"/>	NCBC 1705.6; geotechnical report & construction documents from RDPIRC	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Perform classification and testing of compacted fill materials.		<input checked="" type="checkbox"/>	NCBC 1705.6; geotechnical report & construction documents from RDPIRC	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	<input checked="" type="checkbox"/>		NCBC 1705.6; geotechnical report & construction documents from RDPIRC	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. Prior to placement of compacted fill, inspect sub-grade and verify that site has been prepared properly.		<input checked="" type="checkbox"/>	NCBC 1705.6; geotechnical report & construction documents from RDPIRC	

IT-7 DRIVEN DEEP FOUNDATIONS (Refer to NCBC Section 1705.7)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Verify element materials sizes and lengths comply with the requirements.	<input type="checkbox"/>		NCBC 1705.7; geotechnical report & construction documents from RDPIRC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Determine capacities of test elements and conduct additional load tests as required.	<input type="checkbox"/>		NCBC 1705.7; geotechnical report & construction documents from RDPIRC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Inspect driving operations and maintain complete and accurate records for each element.	<input type="checkbox"/>		NCBC 1705.7; geotechnical report & construction documents from RDPIRC	

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element.	<input type="checkbox"/>		NCBC 1705.7; geotechnical report & construction documents from RDPIRC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. For steel elements, perform additional inspections in accordance with Section 1705.2.			NCBC 1705.7; geotechnical report & construction documents from RDPIRC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. For concrete elements and concrete-filled elements, perform tests and additional special inspections in accordance with Section 1705.2.			NCBC 1705.7; geotechnical report & construction documents from RDPIRC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.			NCBC 1705.7; geotechnical report & construction documents from RDPIRC	

IT 8 CAST-IN-PLACE DEEP FOUNDATIONS (Refer to NCBC Section 1705.8)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Inspect drilling operations and maintain complete and accurate records for each element.	<input type="checkbox"/>		NCBC 1705.8; geotechnical report & construction documents from RDPIRC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes.	<input type="checkbox"/>		NCBC 1705.8; geotechnical report & construction documents from RDPIRC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. For concrete elements, perform tests and additional special inspections in accordance with section 1705.3.	<input type="checkbox"/>		NCBC Section 1705.8; geotechnical report & construction documents from RDPIRC	

IT 9 HELICAL PILES (Refer to NCBC Sections 1705.9)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inspect during installation. Record: 1. Installation equipment used. 2. Pile dimensions. 3. Tip elevations. 4. Final depth. 5. Final installation torque. 6. Other pertinent installation data as req'd by RDPIRC.	<input type="checkbox"/>		NCBC Section 1705.9; geotechnical report & construction documents from RDPIRC	

IT 10 FABRICATED ITEMS (Refer to NCBC Sections 1705.10 & 1704.2.5)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
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<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inspect during fabrication. 1. Structural, 2. Load-bearing or 3. Lateral load-resisting members or assemblies.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NCBC Section 1705.10 or 1704.2.5.	SI are not required if the fabricator meets 1704.2.5, #1 or #2; or if the fabricator is approved per 1704.2.5.1
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IT 11 WIND RESISTANCE (Refer to NCBC Sections 1705.11; 1705.11.1 – 1705.11.3; & 1609.3.1)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
			Only required in the following instances: 1. In wind Exposure Category B, where <i>Vasd</i> is \geq 120 MPH (per 1609.3.1), or 2. In wind Exposure Category C or D, where <i>Vasd</i> is \geq 110 MPH (per 1609.3.1).				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Structural Wood. 1. Gluing elements of the main wind force-resisting system. 2. Nailing, bolting, anchoring, etc. of elements of the main wind force-resisting system.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.11.1	Not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other elements of the MWR system, where the fastener spacing of the sheathing is > 4" o.c.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cold-formed steel light frame construction. 1. Welding operations of elements of the MWRS 2. Screw attachment, bolting, anchoring and other fastening of elements of the MWRS including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs		<input type="checkbox"/>	NCBC 1705.11.2	Not required for shear walls and diaphragms, where either of the following applies: #1. Sheathing is gypsum bd or fiberboard; #2. Sheathing is wood structural panel or steel sheets on one side of the shear wall, panel or diaphragm assembly and the fastener spacing of the sheathing is > 4" o.c.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wind-resisting components 1. Roof covering, roof deck and roof framing connections 2. Exterior wall covering and wall connections to roof and floor diaphragms and framing		<input checked="" type="checkbox"/>	NCBC 1705.11.3	

IT-12 SEISMIC RESISTANCE (Refer to NCBC Sections 1705.12)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
			SI in sections 1705.12.1 – 1705.12.9 are not required for structures designed and constructed in accordance with one of the following: <ol style="list-style-type: none"> Structure is light-frame construction, S_{DS} is not greater than 0.5; and building height is not greater than 35’. SFRS of the structure is reinforced masonry or reinforced concrete, S_{DS} is not greater than 0.5; and building height is not greater than 25’. 				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Structural steel in the seismic force-resisting systems of buildings and structures assigned to SDC B, C, D, E or F.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.12.1.1; AISC 341	Not required in the SFRS of buildings or structures in SDC B or C not specifically detailed for seismic resistance, with response modification coefficient, $R, \leq 3$
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Structural steel elements in the seismic force-resisting systems of buildings or structures assigned to SDC B, C, D, E or F other than those covered in Section 1705.12.1.1, including struts, chords and foundation elements.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.12.1.2; AISC 341	Not required in the SFRS of buildings and structures in SDC B or C with response modification coefficient, $R, \leq 3$
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Structural Wood in the seismic force-resisting systems of structures assigned to SDC C, D, E or F.	<input type="checkbox"/>		NCBC 1705.12.2	These SI are not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other elements of the SFRS when the fastener spacing of the sheathing is > 4” o.c. Includes wood shear walls, wood diaphragms, drag struts braces, panels & hold-down’s.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<ol style="list-style-type: none"> Field gluing operations of elements of seismic force-resisting system Nailing, bolting, anchoring and other fastening of elements of the seismic force-resisting system 		<input type="checkbox"/>		

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Cold-formed steel light frame construction in the SFRS of structures in SDC C, D, E, or F.</p> <ol style="list-style-type: none"> 1. Welding operations of elements of the SFRS 2. Screw attachment, bolting, anchoring, and other fastening of elements of the SFRS including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs 	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.12.3	Not required for shear walls and diaphragms, including screw installation, bolting, anchoring and other fastening to components of the SFRS where either of the following applies: #1. Sheathing is gypsum bd or fiberboard; #2. Sheathing is wood structural panel or steel sheets on one side of the shear wall, panel or diaphragm assembly and the fastener spacing of the sheathing is > 4"o.c
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>Designated seismic systems for structures assigned to Seismic Design Category C, D, E or F. Verify the label, anchorage and mounting conform to the certificate of compliance</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ASCE 7, Section 13.2.2	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Architectural components – erection and fastening of exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer in structures assigned to Seismic Design Category D, E or F</p>	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.12.5	Not required for: #1. Exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer ≤ 30' in height above grade or walking surface. #2. Exterior cladding and interior and exterior veneer weighing 5 psf or less. #3. Interior nonbearing walls weighing 15 psf or less.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Access floors - anchorage in structures assigned to Seismic Design Category D, E or F.</p>	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.12.5.1	

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Plumbing, Mechanical and electrical components: Seismic Design Categories C, D, E or F: 1. Anchorage of electrical equipment for emergency and standby power. 2. Installation and anchorage of piping systems for Hazardous materials and associated mechanical units. 3. Installation and anchorage of ductwork for Hazardous materials. 4. Installation and anchorage of vibration isolation systems where the required clearance is $\leq 1/4''$ between the equipment support frame and restraint.	<input type="checkbox"/>	NCBC 1705.12.6, #1	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	NCBC 1705.12.6, #3	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	NCBC 1705.12.6, #4	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	NCBC 1705.12.6, #5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Seismic Design Categories E or F: 1. Anchorage of other electrical equipment.	<input type="checkbox"/>	NCBC 1705.12.6, #2	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Storage racks $\geq 8'$ in height in Seismic Design Categories D, E or F.	<input type="checkbox"/>	NCBC 1705.12.7	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Seismic isolation systems in seismically isolated structures assigned to SDC B, C, D, E, or F.	<input type="checkbox"/>	NCBC 1705.12.8	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installation of cold-formed steel special bolted moment frames in the SFRS of structures assigned to SDC D, E, or F.	<input type="checkbox"/>	NCBC 1705.12.9	

IT 13 TESTING FOR SEISMIC RESISTANCE (Refer to Section 1705.13)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Structural Steel. 1. Nondestructive testing for seismic resistance for SFRS for buildings assigned to SDC B, C, D, E or F.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.13.1 NCBC 1705.13.1.1 or AISC 341	Exception: SDC B or C buildings with a response modification coefficient ≤ 3 .
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Structural Steel Elements. 1. Nondestructive testing for seismic resistance of structural steel elements in the SFRS of buildings and structures assigned to SDC B, C, D, E or F if not covered in 1705.13.1.1.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.13.1.2 AISC 341	Exception: SDC B or C buildings with a response modification coefficient ≤ 3 .
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nonstructural Components for structures assigned to SDC B, C, D, E or F where the requirements of Section 13.2.1 of ASCE 7 for nonstructural components, supports or attachments are met by seismic qualification as specified in Item 2 therein, the RDPIRC shall specify on the approved construction documents the requirements for seismic qualification by analysis, testing or experience data.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.13.2	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Designated seismic systems for structures assigned to SDC C, D, E or F that are subject to the requirements of Section 13.2.2 of ASCE 7 for certification, the RDPIRC shall specify on the approved construction documents the requirements to be met by analysis, testing or experience data.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.13.3	

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Seismic Isolation Systems in Seismically isolated structures assigned to SDC B, C, D, E, or F.			NCBC 1705.13.4; ASCE 7, section 17.8	
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IT-14 SPRAYED FIRE-RESISTANT MATERIALS (Refer to NCBC Sections 1705.14)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sprayed fire-resistant materials.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.14.4.2 & ASTM E605	4/1000sf
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Floor, roof and wall assemblies	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.14.4.3	4 @12"x12"
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Cellular Decks	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.14.4.4	4 @12"x12"
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Fluted Decks	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.14.4.5	25%
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Structural members	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.14.4.6	9@12"
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Beams and Girders	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.14.4.7	7@12"
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Joists and Trusses	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.14.4.8	12@12"
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Wide-flanged columns	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.14.4.9	4@12"
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Hollow structural section and pipe columns	<input type="checkbox"/>	<input type="checkbox"/>		

IT 15 MASTIC AND INTUMESCENT FIRE-RESISTANT COATING 1705.15

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mastic and Intumescent fire-resistant coating applied to structural elements and decks.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.15; AWCI 12-B	

IT-16 EXTERIOR INSULATION & FINISH SYSTEM (EIFS)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	EIFS application.	<input type="checkbox"/>	<input type="checkbox"/>		Not required for: 1. EIFS applications installed over a water-resistive barrier that drains to the exterior. 2. EIFS applications installed over masonry or concrete walls.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Water-resistive barrier coating when installed over a sheathing substrate.	<input type="checkbox"/>	<input type="checkbox"/>	ASTM E2570	

IT 17 FIRE-RESISTANT PENETRATIONS AND JOINTS (Refer to NCBC Sections 1705.17; 1705.17.1; & 1705.17.2)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		

		Applies to all new high-rise buildings and all new buildings in Risk Category III or IV. Additions, Changes of Use, NCEBC Ch 14 evaluated buildings and Level 3 Alterations within existing high-rises and / or Risk Category III or IV buildings will also require these special inspections.				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>Inspection of tested and listed penetration firestop systems:</p> <p>1. Through penetrations:</p> <p>a. Verify materials before installation.</p> <p>b. Verify against design (Cutsheet or EJ).</p> <p>c. For each type of firestop:</p> <p>i. Witness 10% of installations, or</p> <p>ii. Destructive testing on 2% of installations.</p> <p>d. Verify all firestops are installed.</p> <p>2. Membrane penetrations:</p> <p>a. Verify materials before installation.</p> <p>b. Verify against design (Cutsheet or EJ).</p> <p>c. For each type of firestop:</p> <p>i. Witness 10% of installations or</p> <p>ii. Destructive testing on 2% of installations.</p> <p>d. Verify all firestops are installed.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>NCBC 1705.17.1; ASTM E2174-10ae1</p> <p>10% of installations per floor or per area. Area = 1 sf – 10,000 sf.</p> <p>2% of installations per floor or per area. Area = 1 sf – 10,000 sf</p> <p>10% of installations per floor or per area. Area = 1 sf – 10,000 sf</p> <p>2% of installations per floor or per area. Area = 1 sf – 10,000 sf</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>Installation of tested and listed fire-resistant joint systems:</p> <p>1. Verify materials before installation.</p> <p>2. Verify against design (cutsheet or EJ) .</p> <p>3. For each type of joint system:</p> <p>a. Witness installation of 5% min of total lineal feet of joint system being installed, or</p> <p>b. Destructive testing, disassembly or visual inspection at the rate of at least 1 sample for every 500 lineal feet of the joint system.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>NCBC 1705.17.2; ASTM E2393-10a</p>

IT-18 SMOKE CONTROL (Refer to NCBC Section 1705.18)

ITL	SER	SI	Inspection Task	C	P	Standard	Notes / Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inspection of smoke control system.	<input type="checkbox"/>	<input type="checkbox"/>	NCBC 1705.18	

FINAL REPORT OF SPECIAL INSPECTIONS

Project: *Lillington-Shawtown ES Addition*

Location: *Lillington, NC*

Owner: *Harnett County Schools*

Design Professional in Responsible Charge: *Robert Ferris, AIA, LEED AP*

To the best of my information, knowledge and belief, the Special Inspections required for this project, and itemized in the State of Special Inspections submitted for permit, have been performed and all discovered discrepancies have been reported and resolved other than the following:

Comments:

(Attach continuation sheets if required to complete the description of corrections).

Interim reports submitted prior to this final report form a basis for and are to be considered an integral part of this final report.

Respectfully submitted,
Special Inspector

Licensed Professional Seal

Signature

Date

AGENTS FINAL REPORT OF SPECIAL INSPECTIONS

AGENTS FINAL REPORT

Project: *Lillington-Shawtown ES Addition*

Location: *Lillington, NC*

Owner: *Harnett County Schools*

Design Professional in Responsible Charge: *Robert Ferris, AIA, LEED AP*

To the best of my information, knowledge and belief, the Special Inspections or testing required for this project, and designated for this Agent in the *Statement of Special Inspections* submitted for permit, have been performed and all discovered discrepancies have been reported and resolved other than the following:

Comments:

(Attach continuation sheets if required to complete the description of corrections).

Interim reports submitted prior to this final report form a basis for and are to be considered an integral part of this final report.

Respectfully submitted,

Agent of the Special Inspector

Licensed Professional Seal

Signature

Date

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Temporary Utilities.
 2. Construction Facilities.
 3. Temporary Controls.
 4. Moisture and Mold Control.
 5. Operation, Termination and Removal.

1.3 GENERAL

- A. Use Charges:
1. Installation, use charges, maintenance of and removal of temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities for construction operations without cost, including, but not limited to, Architect, testing agencies, separate contractors and authorities having jurisdiction.
- B. Informational Submittals:
1. Erosion and Sedimentation Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 2. Moisture Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - a. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - b. Indicate procedures for discarding water damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.
 - c. Indicate sequencing of work that requires water, such as sprayed fire resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 3. Dust and HVAC Control Plan: Submit coordination drawing and narrative that indicates the dust and HVAC control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - a. Locations of dust control partitions at each phase of work.
 - b. HVAC system isolation schematic drawing.
 - c. Location of proposed air-filtration system discharge.
 - d. Waste handling procedures.
 - e. Provide positive means to prevent air-borne dust and debris from entering the HVAC air distribution systems, louvers, ductwork, and pathways.
 - f. Other dust control measures.

- C. Quality Assurance:
 - 1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
 - 2. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- D. Temporary Use of Permanent Facilities: Architect and Owner must approve the use of permanent equipment for temporary uses. Approval does not designate acceptance of the system. Prior to operation of permanent equipment for temporary purposes, verify 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. In the case of permanent equipment installed by a separate contractor, and prior to requesting approval of Architect and Owner, engage separate contractor and acquire written approval for each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- E. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Division 01 Section "Closeout Procedures."
- F. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

1.4 TEMPORARY UTILITIES

- A. Temporary Electricity:
 - 1. Provide power service required from utility source as needed for construction operation.
 - 2. Complement existing power service capacity and characteristics as required for construction operations.
 - 3. Provide power outlets, with branch wiring and distribution boxes located as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.
 - 4. Permanent convenience receptacles may not be utilized during construction.
- B. Temporary Lighting For Construction Purposes:
 - 1. Provide and maintain lighting for construction operations to achieve minimum lighting level of 2 watt/sq ft.
 - 2. Provide and maintain minimum 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.
 - 3. Provide and maintain minimum 0.25 watt/sq ft HID lighting to interior work areas after dark for security purposes.
 - 4. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.
 - 5. Maintain lighting and provide routine repairs.

6. Permanent building lighting may be utilized during construction.
- C. Temporary Heating:
1. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
 2. Enclose building prior to activating temporary heat in accordance with Temporary Controls article in this Section.
 3. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise for specific activities and products.
- D. Temporary Cooling:
1. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.
 2. Enclose building prior to activating temporary cooling in accordance with Temporary Controls article in this Section.
 3. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise for specific activities and products.
- E. Temporary Ventilation:
1. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- F. Temporary Communication Services:
1. Internet Service and Wi-Fi Access: Provide and maintain, broadband internet service in field office as part of a functioning field office. Provide desktop computer with Microsoft operating system, Microsoft Office 365 software suite, modem, copier, and printer. Provide access and functionality for Owner, Architect, and Architect's consultants.
- G. Temporary Water Service:
1. Provide suitable quality water service as needed to maintain specified conditions for construction operations.
 2. Extend branch piping with outlets located so water is available by hoses with threaded connections.
- H. Temporary Sanitary Facilities:
1. Provide and maintain required facilities and enclosures. Use of New facility is not permitted. Provide facilities at time of project mobilization.

1.5 CONSTRUCTION FACILITIES

- A. Field Offices and Storage Buildings: Provide with the following minimum requirements.
1. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings and project construction.
 2. Locations: Locate structures minimum distance of 30 feet from existing and new structures.
 3. Construction: Structurally sound, secure, weather tight enclosures, and maintained during project construction.
 - a. Exterior Envelope:
 - 1) Thermal properties to be appropriate to occupancy and storage requirements.
 - 2) Weather resistant materials and finishes.
 4. Removal: At completion of Work, remove buildings, foundations, utility services, and debris. Construct and finish areas in accordance with the Contract Documents.
 - a. If areas are not indicated to receive new construction, restore areas to pre-construction condition.

5. Relocating field office functions to a part of the new construction requires Owner's written agreement.
- B. Storage Buildings: Sized for project related material storage requirements, allowing for access and orderly provision for maintenance and inspection of products in accordance with Section 01 60 00 - Product Requirements.
1. Interior finishes to be as required to provide specified conditions for storage of products.
 2. Heating and ventilation to be as required to maintain products in accordance with Contract Documents.
 3. Lighting to be as required for maintenance and inspection of products.
 4. Maintain storage buildings and surrounding areas.
- C. Field Office: Weather tight, modular type buildings constructed with floors raised above ground, securely anchored to foundations, steps, landings, and ramps as required for occupant entry/egress.
1. Install and make ready for occupancy within 15 days after Notice to Proceed.
 2. Overall Size: Minimum overall dimensions.
 - a. 64 x 36 feet.
 3. Spaces separate from each other as follows:
 - a. Office(s) for Contractor staff and functions.
 - b. Meeting room for project meetings:
 - 1) Tables and chairs to accommodate 16 persons.
 - 2) Minimum 55 inch LED television/monitor mounted on wall for viewing during meetings; equipped with multiple HDMI connections and wireless connectivity.
 - c. Designated space for As-Built drawings to be maintained for the duration of the construction.
 - d. Toilet facilities; fully functioning; continuously stocked with toilet paper, paper towels and hand cleansing products.
 4. Interior Finishes: Sheet type materials for walls and ceilings, pre-finished or painted; resilient flooring and base.
 5. Electrical outlets to be distributed throughout spaces for easy access.
 6. Lighting: Interior lighting to be 50 foot candles at desk top height; exterior lighting at entry/egress doors.
 7. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions of 76 degrees F in summer and 68 degrees F in winter.
 8. Furnishings to be sturdy construction; include hanging rack for drawings and drawings review table.
 9. Parking: Gravel surfaced parking and walk travel ways to office entries. Maintain walk travel ways free of debris, overgrowth, mud, water, and snow.
 10. Maintenance and Cleaning: Provide services as needed and as follows.
 - a. Weekly janitorial services for common areas, meeting room, and toilets; bi-weekly cleaning and maintenance for offices.
 11. Employee Residential Occupancy: Not allowed on Owner's property.
- D. Vehicular Access:
1. Access Location:
 - a. As indicated on Drawings.
 2. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.
 3. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.

4. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
 5. Provide unimpeded access for emergency vehicles. Maintain 20 feet wide driveways with turning space between and around combustible materials.
 6. Provide and maintain access to fire hydrants free of obstructions.
 7. Provide means of removing mud from vehicle wheels before entering streets.
 8. Do not use existing on-site paved surfaces for construction traffic.
- E. Parking:
1. Construct temporary gravel surface parking areas to accommodate construction personnel.
 2. When site space is not adequate, provide additional off-site parking.
 3. Use of existing parking facilities used by construction personnel is not permitted.
 4. Do not allow heavy vehicles or construction equipment in parking areas.
 5. Do not allow vehicle parking on existing pavement.
 6. Permanent Pavements and Parking Facilities:
 - a. Bases for permanent roads and parking areas may be used for construction traffic.
 - b. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
 - c. Use of permanent parking structures is permitted.
 7. Maintenance:
 - a. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
 - b. Maintain existing and 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.
 8. Removal, Repair:
 - a. Remove temporary materials and construction when permanent paving is usable.
 - b. Remove underground work and compacted materials to depth of 2 feet; fill and grade site as specified.
 - c. Repair permanent facilities damaged by use, to original condition.
 9. Mud from Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.
- F. Progress Cleaning and Waste Removal:
1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
 2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.
 3. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
 4. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.
 5. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- G. Project Identification:
1. Project Identification Sign:
 - a. One painted sign of construction, design, and content shown on Drawings, location as designated by Architect and Owner.
 2. Project Informational Signs:

- a. Painted informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering for legibility at 100 feet distance.
 - b. Provide sign at each field offices and storage buildings.
 - c. Provide state traffic agency directional traffic signs to direct traffic into and within site. Relocated as Work progress requires.
 - d. No other signs are allowed except those required by law.
 3. Sign Painter: Experienced as professional sign painter for minimum three years.
 4. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.
 5. Sign Materials:
 - a. Structure and Framing: New, wood, structurally adequate.
 - b. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inches thick, painted both sides, standard large sizes to minimize joints.
 - c. Paint and Primers: Exterior quality, two coats; sign background of color as selected.
 - d. Lettering: Exterior quality paint, colors as selected.
 6. Installation:
 - a. Install project identification sign within 15 days after 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. Anchor securely.
 - e. Paint exposed surfaces of sign, supports, and framing.
 7. Maintenance: Maintain signs and supports clean, repair deterioration and damage.
 8. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.
- H. Traffic Regulation:
1. Provide temporary signs, signals, devices, flag persons, flares and lights as required by codes or local authorities.
 2. Signs, Signals and Devices:
 - a. Post Mounted and Wall Mounted Traffic Control and Informational Signs: As approved by authority having jurisdiction.
 - b. Automatic Traffic Control Signals: If required by and as approved by local jurisdictions.
 - c. Traffic Cones and Drums, Flares and Lights: As approved by authority having jurisdiction.
 - d. Flag Person Equipment: As required by authority having jurisdiction.
 3. Flag Persons: Provide trained, equipped, and State DOT certified flag persons to regulate traffic when construction operations or traffic encroaches on public roadway.
 4. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
 5. Haul Routes:
 - a. Consult with authority having jurisdiction and establish public thoroughfares to be used for haul routes and site access.
 - b. Confine construction traffic to designated haul routes.
 - c. Provide traffic control as required by authority having jurisdiction and at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.
 6. Traffic Signs and Signals:
 - a. Provide signs at approaches to site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

- b. Provide, operate, and maintain 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.
 7. Removal:
 - a. Remove equipment and devices when no longer required.
 - b. Remove post settings and foundations entirely.
 - c. Repair damage caused by installation.

1.6 TEMPORARY CONTROLS

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 1. Comply with work restrictions specified in Division 01 Section "Summary."
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site for the duration of Project.
 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
 1. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
 2. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. Temporary Egress: Maintain protected temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

- I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- J. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. For projects where smoking is not entirely prohibited throughout site:
 - a. Prohibit smoking within buildings under construction. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
 - b. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
 - 5. Portable Fire Extinguishers: Provide UL rated extinguishers appropriate to application needs, capacity, class and extinguishing agent as required by locations and classes of fire exposures. Comply with current requirements of NFPA, OSHA, and local authorities having jurisdiction.
 - a. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable exit.
 - b. Provide minimum one fire extinguisher in each field office and storage building and as otherwise required in construction areas.
- K. Barriers:
 - 1. 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 and demolition operations.
 - 2. Provide barricades, pathways and covered walkways required by governing authorities for public rights-of-way and for public access to and egress from existing buildings.
 - 3. Provide protection for plants designated to remain. Replace damaged plants.
 - 4. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- L. Fencing:
 - 1. Construction: Provide commercial grade chain link fencing and gates not less than 6 feet high unless Drawings indicate otherwise.
- M. Security:
 - 1. Security Program:
 - a. Protect Work from theft, vandalism, and unauthorized entry.
 - b. Initiate program at project mobilization.
 - c. Maintain program throughout construction period until Owner occupancy.
 - 2. Entry Control:

- a. Restrict entrance of non-construction persons and vehicles into Project site.
 - b. Allow entrance only to authorized persons.
- N. Dust Control:
- 1. Execute Work by methods to minimize raising dust from construction operations.
 - 2. Provide positive means to prevent air-borne dust from dispersing into atmosphere.
 - 3. Provide positive means to prevent air-borne dust and debris from entering HVAC air distribution systems, louvers, ductwork, and pathways.
- O. Noise Control:
- 1. Provide methods, means, and facilities to minimize noise produced by construction operations during school (or other facility type) operating hours.

1.7 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to air-borne mold spores, protect as follows:
- 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
- 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 - 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure, but prior to the full operation of permanent HVAC systems, maintain as follows:
- 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - 2. Use temporary HVAC systems to control humidity.
 - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.

- c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

1.8 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary facilities and controls on a daily and 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- B. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Owner acceptance of project.
- C. Termination and Removal: Remove each temporary facility when no longer required, when it has been replaced by authorized use of a permanent facility, and no later than Owner acceptance of project. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Prior to inspection for Owner acceptance, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."
 - 3. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
 - 4. Remove temporary underground installations entirely. Fill, grade and finish as required by Contract Documents.
 - 5. Clean and repair damage caused by installation or use of temporary work.
 - 6. Restore existing conditions and construction to original condition.
 - 7. Restore new project work construction to specified condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Product Delivery Requirements.
 2. Product Storage and Handling Requirements.
 3. Environmental Requirements
 4. Product Options.
 5. Product Substitution Requests.
 6. Equipment Electrical Characteristics and Components.
 7. Spare Parts And Maintenance Products.
 8. Substitution Request Form (attached at end of this Section).
- B. Related Requirements:
1. Section 01 33 00 - Submittal Procedures.
 2. Section 01 40 00 - Quality Requirements: Product quality monitoring.

1.3 DEFINITIONS

- A. Basis of Design Product Specification: A specification in which a specific manufacturer or manufacturer's product is named and accompanied by the words "Basis of Design," and may include make or model number or other designation, to establish significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
- B. Provide, Furnish, and Supply:
1. Provide: To furnish and install.
 2. Furnish: To supply, deliver, unload, inspect for damage, and store.
 3. Supply: Same as Furnish.
- C. Install: To unpack, assemble, erect, apply, place, construct, finish, cure, protect, clean, start up, and make ready for use.
- D. Product: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. Product is material, machinery, components, equipment, fixtures, and systems forming the work result. Product is not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products are new and never before used.
1. All products installed as part of the Work are to be new products, unless otherwise indicated. New products are products that have not been previously incorporated into another project or facility and has not been used. Products salvaged, recycled or re-used from other projects are not considered new products.
 - a. Salvaged, recycled or re-used products are permitted only when specifically indicated as such in the Contract Documents.
 2. Named Product: Items identified by manufacturer or manufacturer's product name, and may include make or model number or other designation shown or listed in

- manufacturer's published product literature, that is current as of date of the Contract Documents.
3. **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.
- E. **Project Manual:** The book-sized volume(s) that includes information about procurement requirements (if any), contracting requirements, and specifications for the Work.

1.4 PRODUCT DELIVERY REQUIREMENTS

- 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. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- F. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.5 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Ambient air temperature and humidity levels to be as required prior to, during and after installation of Work. Minimum requirements to be as recommended by product manufacturer unless requirements indicated in Work specification section are more stringent.

1.7 PRODUCT OPTIONS

- A. Products Specified by Reference Standards and/or by Description Only: Use product complying with the referenced standards and descriptions.
- B. Products Specified by Naming One or More Manufacturers: Use product of one of manufacturers named and complying with specifications.
 - 1. Substitutions allowed only if so stated in the list of manufacturers. Comply with Substitution Request requirements.
 - 2. If Basis of Design manufacturer is indicated, use of Basis of Design product is preferred if other manufacturers are indicated; but, required if no other manufacturer is indicated.

1.8 PRODUCT SUBSTITUTION REQUESTS

- A. Comply with the requirements indicated in the General Conditions of the Contract, the Supplementary General Conditions and as indicated in this Article.
- B. Substitution Requests during the Bidding Period: Architect will consider Requests For Substitutions from Contractor only, and only up to fourteen (14) days before receipt of Bids.
- C. Substitution Requests during the Construction Period: Substitutions may be considered from Contractor only, and only when a product becomes unavailable through no fault of Contractor.
 - 1. During Construction Period, substitutions will not be considered by Architect or Owner when they are indicated or implied on Shop Drawings, Product Data, or other submittal requirements, without separate written and certified Substitution Request.
- D. Substitution Request Submittal Procedure:
 - 1. Submit two copies of each Substitution Request to Architect for consideration. Use Substitution Request Form located at end of this Section. Limit each request to one proposed Substitution. The requirements for Substitution Request are indicated on the Substitution Request Form and as otherwise indicated in the Contract documents.
 - 2. During the Bidding Period (when permitted), Architect will notify Contractor of accepted substitutions by issuance of Addendum.
 - 3. During the Construction Period, Architect will notify Contractor of accepted substitutions in written form. After which, Contractor will provide submittal requirements indicated in the related specification Section.

PART 2 PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENTS

- A. Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
- B. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
- C. 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.
- D. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where products are accompanied by the term "as selected," Architect will make selection.

- F. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- G. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with Product Substitution Requests requirements in this Section for proposal of product.
- H. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from submitted samples" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items; unless indicate otherwise within the Submittals article of specification Section.

2.2 EXISTING PRODUCTS

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

2.3 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. At minimum, comply with specified requirements and reference standards.
- C. Specified products define standard of quality, type, function, dimension, appearance, and performance required.
- D. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.
- E. Where all other criteria are met, Contractor is to give preference to products that:
 - 1. If used on interior, have lower emissions.
 - 2. If wet-applied, have lower VOC content.
 - 3. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 4. Have longer documented life span under normal use.
 - 5. Result in less construction waste.
 - 6. Are made of vegetable materials that are rapidly renewable.
 - 7. Are made of recycled materials.
 - 8. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.
 - 9. Are Cradle-to-Cradle Certified.
 - 10. Have a published Environmental Product Declaration (EPD).
 - 11. Have a published Health Product Declaration (HPD).
 - 12. Have a published GreenScreen Chemical Hazard Analysis.
- F. Furnish interchangeable components from same manufacturer for components being replaced.

2.4 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

- B. Cord and Plug: Furnish minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

2.5 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Required items are for Owner's future maintenance stock and are in addition to items required to install and complete the Work as indicated in the Drawings and Specifications.
- B. Coordinate with Owner to deliver and store Spare Parts and Maintenance Products.
- C. Required items are indicated in the following location(s):
 - 1. In individual Specification Sections in Divisions 01 through 49.
 - 2. In the Drawings.
- D. Items include, but are not limited to, tools, special tools, spare parts, maintenance products, extra materials, and similar items.
 - 1. Items are to match that which was provided as part of the Work during construction unless otherwise indicated.
- E. Label, Package, and Deliver Items: Coordinate delivery times and locations with Owner for attendance and receiving.
 - 1. Package, label and deliver to Project site and place in location as directed by Owner.
 - a. Label items with legible print indicating manufacturer's name, model, series, and color identification.
 - 2. Receipts of Delivery: Prepare, prior to delivery, an itemized receipt for items required to be delivered, to be signed and dated by Contractor and Owner representatives at time of delivery. The receipt shall indicate the following information for each item delivered:
 - a. Project Identification.
 - b. Date and time of delivery.
 - c. Location of delivery.
 - d. Item Specification Section Number and Title.
 - e. Item Description.
 - f. Quantity/Size/Amount Required (as indicated in specifications).
 - g. Quantity/Size/Amount Delivered.
 - h. Signatures/dates certifying delivery by Contractor and receipt by Owner.
 - 3. Submit receipts as support documentation with the List Of Spare Parts and Maintenance Products.
- F. Closeout Submittal: Submit the List of Spare Parts and Maintenance Products as indicated in Section 01 78 39 - Project Record Documents, article Record Certifications Submittals.
 - 1. Prepare itemized list to include all items and quantities required. List to be columnized with columns indicating information indicated above for the Receipts of Delivery. Behind the list, insert the certified Receipts of Delivery, sorted by delivery dates.

PART 3 EXECUTION

Not Used.

SUBSTITUTION REQUEST FORM

Project: _____ Substitution Request Number: _____
 _____ Architect's Project Number: _____
 To: _____ From Company: _____
 _____ Date: _____
 Re: _____ Contract For: _____
 Specification Title: _____ Section #: _____
 Article/Paragraph References: _____
 Proposed Substitution: _____
 Manufacturer: _____ Phone: _____
 Manufacturer Address: _____
 Trade Name: _____ Model #: _____

I have attached complete proposed Substitution data substantiating its compliance with the Contract Documents, including:

1. Reference to Article and Paragraph numbers in Specification Section.
2. Manufacturer's name and address, product, trade name, model or catalog number, performance and test data, and reference standards.
3. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, properties, performance, warranties, and other pertinent characteristics.
4. Certified test data to show compliance with performance characteristics specified.
5. Samples, color and finish options, and shop drawings as applicable or requested.
6. Details indicating changes required in other Work.
7. Cost data comparing proposed substitution with specified product, to include net cost difference.
8. Availability of maintenance service and source of replacement parts as applicable.
9. Other information as necessary to assist Architect's evaluation.

I, _____, certify that:

1. I have provided the information required above.
2. I have investigated proposed substitution within context of adjacent materials and construction, I and determined that it meets or exceeds quality and performance levels of specified product.
3. I will coordinate installation of accepted substitution and make approved changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. I waive claims for additional costs or time extension which may subsequently become apparent.
5. I will reimburse Owner and Architect for review or redesign services associated with re-approval requirements by authorities having jurisdiction and redesign services required otherwise.

Certified By: _____ Signature: _____ Date: _____
 Contractor Company: _____ Phone: _____
 Address: _____

Notary State of: _____ County of: _____

Subscribed and sworn to before me on this _____ day of _____ in the year _____

by: _____ .

Notary Public Signature: _____ My Commission Expires: _____

Notary Public Printed Name: _____

SECTION 01 73 00**EXECUTION****PART 1 GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Examination.
 - 2. Preparation.
 - 3. Construction Layout.
 - 4. Field Engineering.
 - 5. Installation.
 - 6. Cutting and Patching.
 - 7. Coordination of Owner-Installed Products.
 - 8. Progress Cleaning.
 - 9. Starting and Adjusting.
 - 10. Protection of Installed Construction.
 - 11. Maintenance Service.
- B. Related Requirements:
 - 1. Division 01 Section "Summary" for limits on use of Project site.
 - 2. Division 01 Section "Submittal Procedures".
 - 3. Division 01 Section "Closeout Procedures".
 - 4. Division 01 Section "Project Record Documents" for submitting documentation.
 - 5. Division 07 Section "Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

- A. Existing In-Place Materials and Construction: Materials and construction that existed prior to the beginning of Work for this Project and is to remain without compromise after the Work of this Project.
- B. Cutting: Removal of existing in-place materials and construction necessary to permit installation or performance of the Work of this Project.
- C. Patching: Fitting and repair work required to restore existing in-place materials and construction to original conditions after installation of other work.

PART 2 PRODUCTS**2.1 MATERIALS**

- A. General: Comply with requirements specified in other Sections.

PART 3 EXECUTION

3.1 EXAMINATION

- A. General: Verify that existing conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Existing Site Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting or affected by the Work.
 - 1. Verify the locations and invert elevations at points of connection to sanitary sewer, storm sewer, water-service piping, underground electrical and communication services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving project site.
- C. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- D. Examine and verify specific conditions described in individual specification sections.
- E. Verify utility services are available, of correct characteristics, and in correct locations.
- F. Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- G. Examine rough-in of mechanical and electrical systems to verify actual and compliant locations for connections before equipment and fixture installation.
- H. Verify compatibility between new Work to be apply and existing substrates upon which new Work is to be applied, including compatibility with existing finishes, sealers, or primers.
- I. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- J. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- K. 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.
- L. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect.
- M. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and 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 new material or substance in contact or bond.

- D. Verify that the required tools, equipment, utilities, products, and materials are available to the area of Work and that all items are in condition as to produce coordinated workflow and compliant Work.
- E. Separator for Dissimilar Materials: Separate dissimilar materials to prevent galvanic, chemical, and other corrosive action by applying a permanent separator material.
 - 1. Separator Material Requirements:
 - a. Permanent type that will remain concealed in the applied location without running, staining, or migrating onto visible finish surfaces.
 - b. Material approved by manufacturers of materials being separated.
 - 2. Separator material may include the following if it complies with the indicated separator material requirements.
 - a. Zinc molybdate alkyd coating, minimum dry film thickness of 15 mil.
 - b. Bituminous coating, minimum dry film thickness of 15 mil.
 - c. Self-adhering rubberized asphalt sheet.
 - d. Other permanent separator material complying with indicated requirements.
- F. Exterior Wood Without Shop Applied Finish: Where field-coated wood materials are indicated, back-prime all concealed surfaces with primer/sealer recommended by coating manufacturer for substrate materials.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a Professional Land Surveyor, registered in the State in which the project is located, to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Owner and Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Final Property Survey:
1. Contractor is to engage the services of a Professional Land Surveyor to prepare a final property survey showing significant features and real property as constructed in accordance with the Contract Documents.
 2. The land surveyor is to be registered in the State in which the project is located.
 3. Survey is to indicate final completed property conditions and features.
 4. Survey is to include land surveyor signed certification that the principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - a. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 5. Contractor is to review the survey documentation to confirm that the survey indicates the Work is compliant with the requirements of the Contract Documents. Noncompliant Work is to be corrected by the Contractor and the correction(s) are to be updated in the survey and certified by surveyor in the survey documentation.
 - a. Contractor is to submit compliant final survey to Owner with Contractor's written letter certifying that the final survey indicates the Work to be compliant with the requirements of the Contract Documents.
 - b. Record the compliant final property survey with the appropriate authorities having jurisdiction as the official "Property Survey".
 - c. Record Documents: Include the following in the project closeout record documents.
 - 1) Copy of the surveyor certified, compliant final property survey.
 - 2) Copy of Contractor's compliance certification.
 - 3) Evidence of official recording of compliant final property survey with the appropriate authorities having jurisdiction.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.

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

3.6 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Execute cutting, fitting, and patching to complete Work, and to:
1. Fit the several parts together, to integrate with other Work.
 2. Uncover Work to install or correct ill-timed Work.
 3. Remove and replace defective and non-conforming Work.
 4. Remove samples of installed Work for testing.
 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- C. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.
- D. Patching Existing In-Place Materials: Use materials for patching identical to the existing in-place materials. For exposed surfaces, use materials that visually match the existing in-place adjacent surfaces.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual, functional and performance requirements of the existing in-place materials.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, and floor construction. Completely seal voids.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Division 07 of the Specifications, to full thickness of penetrated element.
- J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- K. Identify hazardous substances or conditions exposed during the Work to Owner and Architect for decision or remedy.

3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's separate construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner provided work and separate contractors.
 1. Construction Schedule: Incorporate services and work activities of Owner provided work and separate contractors into the project's Construction Schedule.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements of local and state authorities and as indicated in the contract documents related to Construction Waste Management and Disposal.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 and other Sections related to "Commissioning".
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Testing and Balancing: Test and balance HVAC and controls system to operate at required levels of performance. Record and submit process and final testing and balancing results indicating compliance with project requirements.
- F. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide protection and maintain conditions that ensure installed Work is without damage or deterioration until Owner acceptance of project. Temporarily remove protective measures as required for required inspections, then reapply protective measures until Owner acceptance of project.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.11 MAINTENANCE SERVICE

- A. Maintenance Service Period: As indicated in individual specification sections or, if not indicated, not less than one (1) year from the Date of Substantial Completion.
- B. Provide service and maintenance for components and systems as indicated in individual specification sections and provide the following minimum requirements.
 - 1. Implement systematic, scheduled, and on-site services.
 - 2. Coordinate service dates and times with Owner to avoid disruption of Owner's operations.
 - 3. Examine system components at a frequency consistent with maintaining reliable operations.
 - 4. Clean, adjust, and lubricate as required.

5. Repair or replace parts that are not functioning properly with parts produced by the manufacturer of the original component or system.
- C. Maintenance service shall not be assigned or transferred to any other agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative, certification and procedural requirements for contract closeout, including, but not limited to, the following:
1. Procedures Prior to Substantial Completion.
 2. Substantial Completion Procedures.
 3. Final Completion Procedures.
 4. Final Cleaning.
 5. Repair of the Work.
- B. Related Requirements:
1. Division 01 Section "Administrative Requirements".
 2. Division 01 Section "Execution" for progress cleaning of Project site.
 3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
 6. Sections indicating specific operation and maintenance manual requirements for the Work in those Sections.
 7. Sections indicating specific closeout and special cleaning requirements for the Work in those Sections.
 8. Sections indicating Commissioning Requirements for verification and compilation of data into operation and maintenance manuals.

1.3 PROCEDURES PRIOR TO SUBSTANTIAL COMPLETION

- A. Complete the following a minimum of two (2) months prior to execution of Demonstration and Training for Owner.
1. Operation and Maintenance Manuals: Refer to Section 01 78 23 - Operation and Maintenance Data for requirements.
 - a. Submit Initial O&M Manuals two (2) months prior to training for Owner.
- B. Complete the following a minimum of thirty (30) days prior to issuance of Contractor Request for Substantial Completion Inspection.
1. Project Closeout Meeting: Refer to Section 01 30 00 - Administrative Requirements for requirements. Provide notice to indicated attendees a minimum of seven (7) days prior to meeting.
- C. Complete the following a minimum of ten (10) days prior to issuance of Contractor Request for Substantial Completion Inspection.
1. Project Record Documents: Initial Submittals of the Record Documents.
 - a. Refer to Section 01 78 39 - Project Record Documents.
 - b. Complete all Section requirements and submit Initial Submittals indicated.

2. Demonstration and Training: Initial Submittal of the Demonstration and Training Manual.
 - a. Refer to Section 01 79 00 - Demonstration and Training.
 - b. Complete all Section requirements and submit Initial Submittal indicated.
3. Acquire and prepare documentation required as part of the Contractor Request for Substantial Completion Inspection.
4. Submit LEED and other Sustainable Design Submittals required in Division 01 for sustainable design and reporting requirements.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

- A. Substantial Completion Inspection: Submit a written request to Architect for inspection for certification of date of Substantial Completion a minimum of thirty (30) days prior to date the work will be completed and ready for final inspection. Include Contractor's List of Incomplete Items (AKA Punch List) as further detailed in the LIST OF INCOMPLETE ITEMS article in this Section.
 1. On receipt and review of request, Architect will either proceed with scheduling inspection or notify Contractor of unfulfilled requirements that preclude certification of Substantial Completion.
 - a. In such case that the Architect provides notification to Contractor of unfulfilled requirements, Contractor will complete the noted and other such incomplete requirements that preclude certification of Substantial Completion. Whereafter, Contractor will issue another written request to Architect of inspection.
 2. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list of incomplete work or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
 - a. If, during inspection, the Architect determines certification cannot be issued, the Architect will discontinue further inspection and provide notification report to Contractor of such determination.
 - b. In such case that the Architect's inspection report determines that certification cannot be issued, complete the noted and all incomplete work and provide written request for reinspections to include a copy of the Architect's previous report of the failed inspection. Copy of report to include Contractor's certification and date and Contractor initials of completion by each deficient item completed in preparation for reinspections.
 - c. Results of completed inspection will form the basis of requirements for final completion.

1.5 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
 1. Submit final Certificate For Payment according to Division 01 Section "Payment Procedures."
 2. Contractor Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection report and list of items to be completed or corrected (punch list), indicating completion as follows:
 - a. Each item dated and initialed by Contractor's Superintendent as being inspected and complete.
 - b. Certification by Contractor's Project Manager that Punch List and all Work is complete.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Corrected closeout and project documentation that was previously deficient.
 5. Remaining closeout and project documentation not yet submitted.
 6. Submit Final Operation and Maintenance Manuals Submittal as indicated in Section 01 78 23 - Operation and Maintenance Data.
 7. Submit Final Project Record Documents Submittal as indicated in Section 01 78 39 - Project Record Documents.
 8. Submit Final Demonstration and Training Manual: Refer to Section 01 79 00 - Demonstration and Training.
- B. Final Completion Inspection: Submit a written request to Architect for final inspection to determine acceptance a minimum of ten (10) days prior to date the work will be completed and ready for final inspection and tests.
1. On receipt and review of request, Architect will either proceed with scheduling inspection or notify Contractor of unfulfilled requirements that preclude certification of final Certificate For Payment.
 - a. In such case that the Architect provides notification to Contractor of unfulfilled requirements, Contractor will complete the noted and other such incomplete requirements that preclude certification of final Certificate For Payment. Whereafter, Contractor will issue another written request to Architect of inspection.
 2. Architect will process the final Certificate For Payment after inspection or will notify Contractor of incomplete requirements that must be completed or corrected before certificate will be issued.
 - a. If, during inspection, the Architect determines certification cannot be issued, the Architect will discontinue further inspection and provided notification report to Contractor of such determination.
 - b. In such case that the Architect's inspection report determines that certification cannot be issued, complete the noted and all incomplete work and provide written request for reinspections to include a copy of the Architect's previous report of the failed inspection. Copy of report to include Contractor's certification and date and Contractor initials of completion by each deficient item completed in preparation for reinspections.
 - 1) Contractor's written request for reinspections to include an updated final Certificate For Payment and updated Contractor Certified List of Incomplete Items.

1.6 LIST OF INCOMPLETE ITEMS

- A. Time of Submittal: Contractor is to submit along with written request to Architect for inspection to determine Substantial Completion.
- B. Prepare and submit a comprehensive list of contract requirements and work to be completed and corrected (Contractor's Punch List), indicating the value of each item on the list and reasons why the Work is incomplete.
- C. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Also, include at the beginning of the list, incomplete contract requirements (administrative and otherwise) other than construction work.
 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. Contractor's Certification signature and date (First page only).
 - f. Page number "of" Total pages.
4. Submit list of incomplete items in the following format:
- a. PDF electronic file. Architect will return annotated file.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.
- C. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

- j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.
- D. Construction Waste Disposal:
- 1. Remove construction waste from site and dispose of waste in accordance with regulatory codes, laws, ordinances, and requirements of Authority Having Jurisdiction.
 - 2. Comply with waste disposal requirements to include, but not limited to Section 01 73 00 - Execution as related to Progress Cleaning.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Remove and replace chipped, scratched or otherwise marred cast stone units and natural stone units.
 - 3. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 4. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 5. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
1. Emergency, Operation and Maintenance Documentation Directory Manual.
 2. Emergency Manual - systems, subsystems and equipment.
 3. Operation Manual - systems, subsystems and equipment.
 4. Systems and Equipment Maintenance Manual - systems, subsystems and equipment.
 5. Product Maintenance Manual.
- B. Related Requirements:
1. Sections indicating Closeout Procedures.
 2. Sections indicating Submittal Procedures for submitting copies of submittals for operation and maintenance manuals.
 3. Sections indicating Commissioning Requirements for verification and compilation of data into operation and maintenance manuals.
 4. Sections indicating specific operation and maintenance manual requirements for the Work in those Sections.
 5. Sections indicating Demonstration and Training requirements.

1.3 DEFINITIONS

- A. Digital Media Device: Digital media drive device, readable with current Microsoft operating system software. Digital files are to allow for reviewer comments and markup to be added.
- B. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- C. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Manuals Content: Content is to include pertinent data and data 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.
1. Where applicable, clarify and update content of manuals to correspond to revisions and field conditions.
- B. Manuals Format: Format to be as follows and as further detailed in this Section and the Contract Documents:
1. Electronic Copies (PDF electronic file): Assemble each manual into a composite electronically indexed file. Submit on Digital Media Device.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory. Label each digital media device indicating content name

- of manual; project identification name and numbers; and names and phone numbers of Owner and Contractor (and Construction Manager, if any).
- b. Electronic files are to allow for reviewer comments and markups to be added.
- 2. Paper Copies: Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.
- C. Initial Manuals Submittal:
 - 1. Submit at time indicated in Section 01 77 00 - Closeout Procedures.
 - 2. Submit two (2) Electronic Copies of Manuals as described in this Section.
 - 3. Submit one (1) Paper Copies of Manuals as described in this Section.
- D. Final Manuals Submittal:
 - 1. Correct deficiencies from Initial Submittal.
 - 2. Submit at time indicated in Section 01 77 00 - Closeout Procedures.
 - 3. Submit two (2) Electronic Copies of Manuals as described in this Section.
 - 4. Submit three (3) Paper Copies of Manuals as described in this Section.

1.5 REQUIREMENTS FOR MANUALS

- A. Comply with these requirements for each Manual to be submitted for this Project. Requirements apply to both Paper Copy and Electronic Copy manual formats and for Initial and Final Manual submissions.
- B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- C. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Construction Manager (if any).
 - 7. Name and contact information for Architect.
 - 8. Name and contact information for Commissioning Authority (if any).
 - 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manual.
 - 10. Cross-reference to related systems in other manuals.
- D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. Main headings in table of contents to be Specification Section Number and Title. Inset below each main heading the description of the documentation provided and table of contents reference number in sequence as follows:
 - a. Number prefix to be Section Number (without spaces), followed by two-digit sequence number.
 - b. Examples: 044200-01; 044200-02; etc. 081416-01; 081416-02; etc.
 - 2. Divider tab insert numbers to match table of content reference numbers.
 - 3. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

- E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- F. Electronic Copies of Manuals: Prepare manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use manufacturer's electronic files when available. Otherwise, scan paper documents to electronic files for inclusion.
 2. File Names and Bookmarks: Provide digitally linked 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 book-marks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
 3. Submittal Media: Electronic Digital Media Device. Two copies of device; labeled with identification information; inserted into sleeve at front of Paper Copies of Manuals.
- G. Paper Copies of Manuals: Prepare manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 x 11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary, to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine with printed title of manual type; project name and Owner project number(s); subject matter of contents; and name, address and telephone number of Contractor (and Construction Manager, if any). At the bottom of each binder front and spine, indicate "01 78 23 - O&M Data - Vol 1 of 4" (sequence Volume # by manual type).
 2. Dividers: Heavy-paper dividers with plastic insert tabs for insertion of table of contents reference number.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2 x 11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

PART 2 PRODUCTS

2.1 EMERGENCY, OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- 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 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 manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems".

2.2 EMERGENCY MANUAL

- A. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - 1. Fire.
 - 2. Flood.
 - 3. Gas leak.
 - 4. Water leak.
 - 5. Power failure.
 - 6. Water outage.
 - 7. System, subsystem, or equipment failure.
 - 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 - 1. Instructions on stopping.
 - 2. Shutdown instructions for each type of emergency.
 - 3. Operating instructions for conditions outside normal operating limits.
 - 4. Required sequences for electric or electronic systems.
 - 5. Special operating instructions and procedures.

2.3 OPERATION MANUAL

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

2.4 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 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, semi-annual, 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.

2.5 PRODUCT MAINTENANCE MANUAL

- A. **Content:** Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. **Source Information:** List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. **Product Information:** Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. **Maintenance Procedures:** Include manufacturer's written recommendations and the following:

1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 EXECUTION

3.1 MANUAL PREPARATION

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

END OF SECTION

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
1. Record Contract Drawings.
 2. Record Shop Drawings.
 3. Record Specifications (Project Manual).
 4. Record Product Data and Samples.
 5. Record Certifications.
 6. Record Project Warranties.
- B. Related Requirements:
1. Division 01 Section "Execution" for additional requirements including, but not limited to, Final Property Survey, and Starting and Adjusting equipment.
 2. Division 01 Section "Closeout Procedures" for general closeout procedures.
 3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 4. Divisions 03 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 DEFINITIONS

- A. Digital Media Device: Digital media drive device, readable with current Microsoft operating system software. Digital files are to allow for reviewer comments and markup to be added.
- B. Record Prints: Contractor maintained documents on which the Contractor records approved new information and revisions to the original information thereon. The recording process and result is often referred to as "marked-up" and "as-built" documents.

1.4 RECORDING AND MAINTENANCE

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

1.5 CLOSEOUT SUBMITTALS

- A. General Requirements:
1. Reproductions of photocopy type and electronic scanned type:

- a. Quality: Reproductions are to accurately depict the colors and information on the Contractor's Record Prints and other documents.
 - b. Size: Reproductions on paper media and as PDF electronic files are to be the same size as the Contractor's Record Prints and other documents.
 2. Prior to making submissions, verify quality of color and legibility of reproduction.
 3. For each submission, include all pages and sheets of the required documentation, whether, or not, changes and additional information were recorded thereon.
 4. Initial Record Submittals: Submit for Architect.
 - a. Submittal time to be as indicated in Section 01 77 00 - Closeout Procedures.
 5. Final Record Submittals: Submit for Owner and for Architect, each.
 - a. Prior to submission, correct deficiencies observed after the Initial Submittal.
 - b. Submittal time to be as indicated in Section 01 77 00 - Closeout Procedures.
- B. Record Contract Drawings Submittal.
 1. Initial Submittal:
 - a. Paper Copy Format: Submit photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.
 2. Final Submittal:
 - a. Paper Copy Format: Submit photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device
- C. Record Shop Drawings Submittal.
 1. Initial Submittal:
 - a. Paper Copy Format: Submit photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.
 2. Final Submittal:
 - a. Paper Copy Format: Submit photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.
- D. Record Specifications Submittal.
 1. Initial Submittal:
 - a. Paper Copy Format: Submit photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.
 2. Final Submittal:
 - a. Paper Copy Format: Submit photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.
- E. Record Product Data and Samples Submittal.
 1. Initial Submittal:
 - a. Paper Copy Format: Submit photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.
 2. Final Submittal:
 - a. Paper Copy Format: Submit photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.
 3. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate Record Product Data as a component of manual and in formats as required for O&M manuals submission.
- F. Record Certifications Submittal.
 1. Initial Submittal:
 - a. Paper Copy Format: Submit photocopies of Certifications.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.
 2. Final Submittal:
 - a. Paper Copy Format: Submit originals of Certifications for Owner, and photocopy of Certifications for Architect.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.

- G. Record Project Warranties Manual Submittal.
 - 1. Initial Submittal: Warranties with information filled in, but not executed with certification signatures and dates.
 - a. Paper Copy Format: Submit photocopies in Warranties Manual.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.
 - 2. Final Submittal: Documents to be executed with certification signatures and dates.
 - a. Paper Copy Format: Submit originals in Warranties Manual for Owner, and photocopies in Warranties Manual for Architect.
 - b. Electronic Scanned Files Format: Submit on Digital Media Device.

PART 2 PRODUCTS

2.1 RECORD PRINTS - CONTRACT DRAWINGS AND SHOP DRAWINGS

- A. Contractor is to maintain Record Prints as marked-up copies of original Contract Drawings and approved Shop Drawings in two (2) format types. Both formats to be maintained current and to be available for review by Owner and Architect throughout construction progress.
 - 1. Marked-Up Paper Copies Format.
 - 2. Electronic Marked-Up (annotated) PDF Format.
 - a. Annotations and associated data to be distinct and viewable by PDF software applications "Bluebeam REVU" and "Adobe Acrobat".
- B. Preparation: Promptly incorporate new and revised drawings, notes, and approved installation variations as modifications are issued. Contractor's personnel to be proficient at recording graphic and electronic information in both format types. During project closeout, both format types will be submitted as the Contractor's Record Prints for the Contract Drawings and the Shop Drawings.
 - 1. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to provide information for Contractor to apply to corresponding marked-up Record Prints.
 - 2. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - 3. Accurately record information in an acceptable drawing technique.
 - 4. Record data daily after obtaining it.
 - 5. Record and check the markup before enclosing concealed installations.
 - 6. Cross-reference Record Prints to corresponding archive photographic documentation.
- C. 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.
 - 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.
 - 10. Changes made by Change Order, Construction Change Directive and Field Orders.
 - 11. Changes made following Architect's written orders.
 - 12. Details not on the original Contract Drawings.
 - 13. Field records for variable and concealed conditions.
 - 14. Record information on the Work that is shown only schematically.
- D. Mark the Record Prints completely and accurately.

- E. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- F. Mark important additional information that was either shown schematically or omitted from original Drawings.
- G. Incorporate new drawings received, including but not limited to, drawings received as part of Addenda, Construction Change Directives, Change Orders or Field Orders.
- H. When entire drawing sheet is replaced by a newly issued drawing, indicate with a large red "X" through the entire deleted sheet and note in red the identification of the new drawing sheet (e.g. "This Sheet Replaced By _____; Change Order # ____; Dated ____).
 - 1. Insert the new drawing sheet behind the deleted drawing and identify it similarly (e.g. "This Sheet Added To Replace _____; Change Order # ____; Dated ____).
- I. Note Construction Change Directive numbers, Alternate numbers, Change Order numbers, Field Order numbers and similar identification, where applicable.

2.2 RECORD CONTRACT DRAWINGS SUBMITTAL

- A. Paper Copy Format:
 - 1. Bind each set of final marked-up Record Prints into volume sets in like manner as the original contract drawings.
 - 2. Annotate in red the following in a prominent and consistent location on each sheet (including sheets with no markups).
 - a. Designation "PROJECT RECORD CONTRACT DRAWINGS".
 - b. Name of Contractor.
 - c. Signature and Date.
- B. Electronic Scanned Files Format:
 - 1. Scan marked-up Record Prints as PDF electronic files.
 - 2. Each drawing sheet to be separate electronic file.
 - 3. Name each file with the sheet identification number and title, and add a 3-digit prefix that sequences the files in the order in which each sheet appeared in the original contract drawings (e.g. "043_A-603 Door and Frame Elevations.pdf").
 - 4. For added drawings, provide sequencing of file names in logical and contextual order similar to original contract drawings.
 - 5. Create digital hyperlinked bookmarks for each sheet that provides a single bookmarked navigation panel for accessing sheets by clicking bookmark (bookmarked table of contents).
 - 6. Identification Information:
 - a. Electronically annotate in red the following in a prominent and consistent location on cover sheet of each drawings set volume:
 - 1) Same information as indicated for Paper Copy Format.
 - 7. Electronically annotate in red the following in a prominent and consistent location on each page (including pages with no mark-ups):
 - a. Designation "PROJECT RECORD CONTRACT DRAWINGS".
 - 8. Label electronic digital media device with same information as indicated for Paper Copy Format.

2.3 RECORD SHOP DRAWINGS SUBMITTAL

- A. Paper Copy Format:
 - 1. 3-Ring Binder Format: Drawing sets size 8-1/2 x 11 inches and 17 x 11 inches.
 - a. Bind in 3-ring hard binder. Binder sized to hold 8-1/2 x 11 inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets

- inside covers. For 17 x 11 inch sheets, fold each sheet at 8-1/2 inches and back fold at 12-3/4 inches to facilitate unfolding view of content.
- b. Organize drawing sets in sequence by Specification Section Number.
 - c. Insert durable divider tab sheet at beginning of each set. Each extended tab to indicate Specification Number. Binder holes are to be reinforced to prevent pull-out.
 - d. Insert identification information in cover sleeve and spine sleeve.
 - 1) Designation "PROJECT RECORD SHOP DRAWINGS".
 - 2) Project Name and Number.
 - 3) Name of Contractor.
 - 4) Signature and Date.
 - e. First page in each binder is to be the overall record shop drawings directory.
 - 1) Provide overall directory titled "Directory for Project Record Shop Drawings". List each set of shop drawings sequenced by Specification Section Number - Title and Subtitle.
 - 2) Include a column indicating "3-Ring Binders" or "Bound Sets" for each item. The intent is to direct the viewer to the appropriate archived format location.
2. Bound Sets Format: Drawing sets larger than indicated for 3-Ring Binder Format.
- a. Bind each set with durable paper cover sheet and folded heavy paper spine.
 - b. Include identification information on cover sheets:
 - 1) Same information as indicated for 3-Ring Binder Format.
 - 2) Add a copy of the overall record shop drawings directory.
- B. Electronic Scanned Files Format:
1. Scan marked-up Record Prints as PDF electronic files.
 2. Each set of shop drawings to be separate electronic file with one or more sheets.
 3. Name each file with the corresponding Specification Section Number - Title_Subtitle. (e.g. "07 32 00 - Roofing_Insulation.pdf").
 4. Provide a file with overall directory titled "Directory for Project Record Shop Drawings", listing each set of shop drawings sequenced by Specification Section Number - Title_Subtitle. Name of directory file to be "00 00 00 - Directory for Project Record Shop Drawings.pdf". Title at top of directory page to be two lines. First line to indicate project name and number. Second line to be "Directory for Project Record Shop Drawings". Create digital hyperlinked bookmarks for each directory item that is linked to the corresponding shop drawing file.
 5. Identification Information:
 - a. Electronically annotate in red the following in a prominent and consistent location of each drawing sheet (including sheets with no mark-ups):
 - 1) Same information as indicated for 3-Ring Binder Format.
 - b. Label electronic digital media device with same information as indicated for 3-Ring Binder Format.

2.4 RECORD PRINTS - SPECIFICATIONS (Project Manual)

- A. Maintain one set of marked-up paper copies of the original Specifications, incorporating new and revised drawings and notes as modifications are issued. Contractor's personnel to be proficient at recording graphic information in production of marked-up Record Prints.
- B. Preparation: Mark Record Prints to show the actual product 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 Contractor to apply to corresponding marked-up Record Prints.
 1. Give particular attention to information on concealed products and installation that would be difficult to identify and record later.

2. Accurately record information in an acceptable and legible manner.
 3. Record data daily after obtaining it.
 4. Mark Table of Contents to include deletions, additions, and other modifications.
 5. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options, finishes and colors selected.
 6. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
- C. Mark the Record Prints completely and accurately.
- 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.

2.5 RECORD SPECIFICATIONS (Project Manual) SUBMITTAL

- A. Paper Copy Format:
1. Bind each set of marked-up Record Prints into volume sets in like manner as the original specifications.
 2. Include identification information on cover pages.
 - a. Designation "PROJECT RECORD SPECIFICATIONS".
 - b. Name of Contractor.
 - c. Signature and Date.
- B. Electronic Scanned Files Format:
1. Scan marked-up Record Prints as PDF electronic files.
 2. Each specification volume to be separate electronic file.
 3. Name each file "Record Specifications - Volume #.pdf".
 4. Create digital hyperlinked bookmarks for each specification section that matches marked-up Table of Contents.
 5. Identification Information:
 - a. Electronically annotate in red the following in a prominent and consistent location on cover page of each specifications volume:
 - 1) Same information as indicated for Paper Copy Format.
 - b. Electronically annotate in red the following in a prominent and consistent location on each page (including pages with no mark-ups):
 - 1) Designation "PROJECT RECORD SPECIFICATIONS".
 - c. Label electronic digital media device with same information as indicated for Paper Copy Format.

2.6 RECORD PRINTS - PRODUCT DATA AND SAMPLES

- A. Maintain one set of marked-up paper copies of the approved Product Data and Samples, incorporating notes and modifications as approved. Contractor's personnel to be proficient at recording graphic information in production of marked-up Record Prints. Record Prints for Samples are paper copies (including photos as needed) of approved submitted Samples for the purpose of documenting approvals and recording changes. Physical samples are to be maintained by Contractor until disposition is confirmed by Contractor with Architect and Owner during required Closeout Meeting.
- B. Preparation: Mark Record Prints to show the actual product installation where installation varies substantially from that shown in approved Product Data and Sample submittals. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to provide information for Contractor to apply to corresponding marked-up Record Prints.

1. Give particular attention to information on concealed products and installation that would be difficult to identify and record later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Accurately record information in an acceptable and legible manner.
 4. Record data daily after obtaining it.
- C. Mark the Record Prints completely and accurately.
- 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.

2.7 RECORD PRODUCT DATA AND SAMPLES SUBMITTAL

- A. Paper Copy Format:
1. Bind in 3-ring hard binder. Binder sized to hold 8-1/2 x 11 inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers. For 17 x 11 inch sheets, fold each sheet at 8-1/2 inches and back fold at 12-3/4 inches to facilitate unfolding view of content. For oversized sheets, insert heavy-duty 3-ring type clear plastic pocket holders for inserting documents. Use multiple pocket holders in succession to avoid over-stuffing pocket holders.
 2. Organize product data and samples sets in sequence by Specification Section Number.
 3. Insert durable divider tab sheet at beginning of each product data set. Each extended tab to indicate Specification Number. Binder holes are to be reinforced to prevent pull-out.
 4. Insert identification information in cover sleeve and spine sleeve.
 - a. Designation "PROJECT RECORD PRODUCT DATA AND SAMPLES".
 - b. Project Name and Number.
 - c. Name of Contractor.
 - d. Signature and Date.
 5. First page in each binder to be overall directory titled "Directory for Project Record Product Data and Samples". List each set of product data and samples sequenced by Specification Section Number - Title_Subtitle. Coordinate directory items with divider tab sheets.
- B. Electronic Scanned Files Format:
1. Scan marked-up Record Prints as PDF electronic files.
 2. Each set of product data to be separate electronic file with one or more pages.
 3. Name each file with the corresponding Specification Section Number - Title_Subtitle. (e.g. "07 32 00 - Roofing - Insulation.pdf").
 4. Provide a file with overall directory titled "Directory for Project Record Product Data and Samples", listing each set of product data and samples sequenced by Specification Section Number - Title_Subtitle. Name of directory file to be "00 00 00 - Directory for Project Record Product Data and Samples.pdf". Title at top of directory page to be two lines. First line to indicate project name and number. Second line to be "Directory for Project Record Product Data and Samples". Create digital hyperlinked bookmarks for each directory item that is linked to the corresponding product data file.
 5. Identification Information:
 - a. Electronically annotate in red the following in a prominent and consistent location of each product data and samples page (including pages with no mark-ups):
 - 1) Same information as indicated for 3-Ring Binder Format.
 - b. Label electronic digital media device with same information as indicated for 3-Ring Binder Format.

2.8 RECORD CERTIFICATIONS SUBMITTAL

- A. Content: Documentation includes, but is not limited to, the following.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Health Department Inspection and Acceptance: Obtain written acceptance for areas of construction receiving or required to receive such inspection.
 3. Fire Marshal Inspection and Acceptance: Obtain written acceptance for areas of construction receiving or required to receive such inspection.
 4. Certificate of Insurance: For continuing coverage. Include documentation of changeover requirements.
 5. Changeover information related to Owner's occupancy, use, operation and maintenance of HVAC and other building systems, and other utilities. Include record of startup, testing and preventative maintenance performed for systems and equipment.
 6. Stairs and Ramps Compliance Certification. Refer to PART 3 - EXECUTION in this Section, article Stairs and Ramps Compliance Certification.
 7. Spare Parts and Maintenance Products Delivery Certification.
 8. Permanent Locks, Keys and Security: Certification signed/dated by both Contractor and Owner indicating completion of final changeover of permanent locks and delivery of keys and pertinent documentation to Owner.
 9. Record of inspection and walkthrough with Owner and local emergency responders.
 - a. Schedule and conduct inspection and walkthrough with Owner and local emergency responders. Provide record of the event.
 10. Record of termination and removal of temporary facilities.
 - a. Terminate and remove temporary facilities from Project site, including mockups, construction equipment, and similar elements.
 11. Record of completion of final cleaning requirements.
 - a. Complete final cleaning requirements, including touchup painting.
 12. Damage or Settlement Surveys.
 13. Final Property Survey.
 14. Testing and Balancing HVAC and Controls.
 15. For projects with LEED or other Sustainable Design requirements, submit LEED and other Sustainable Design Submittals required in Division 01 for sustainable design and reporting requirements.
 16. Miscellaneous Records: Includes submission of required project records, certifications and documentation associated with various construction activities or indicated in Divisions 01 through 49 Sections that are not related to other named closeout submittal types.
- B. Paper Copy Format:
1. Bind in 3-ring hard binder. Binder sized to hold 8-1/2 x 11 inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers. For 17 x 11 inch sheets, fold each sheet at 8-1/2 inches and back fold at 12-3/4 inches to facilitate unfolding view of content.
 2. Provide multiple volume binders of quantity if data quantity dictates.
 3. Organize categories of documents by numbered logical sequence.
 4. Insert durable divider tab sheet at beginning of each document type. Extended tabs to be type for text insertion. Binder holes to be reinforced to prevent pull-out.
 5. Insert identification information in cover sleeve and spine sleeve.
 - a. Designation "PROJECT RECORD CERTIFICATIONS". Add volume # if more than one volume is needed.
 - b. Project Name and Number.

- c. Name of Contractor.
 - d. Signature and Date.
 6. First page in each binder to be overall directory titled "Directory for Project Record Certifications". List each document type and sub-document sequentially with title and subtitle. Coordinate directory items with divider tab sheets.
- C. Electronic Scanned Files Format:
1. Scan documents as PDF electronic files.
 2. Each document to be separate electronic file with one or more pages.
 3. Name each file with the corresponding Specification Section Number - Title_Subtitle. (e.g. "31 31 16 - Termite Control - Application Records.pdf").
 4. Provide a file with overall directory titled "Directory for Project Record Certifications", listing document type sequenced by Specification Section Number - Title_Subtitle. Name of directory file to be "00 00 00 - Directory for Project Record Certifications.pdf". Title at top of directory page to be two lines. First line to indicate project name and number. Second line to be "Directory for Project Record Certifications". Create digital hyperlinked bookmarks for each directory item that is linked to the corresponding product data file.
 5. Identification Information: Label electronic digital media device with same information as indicated for 3-Ring Binder Format.

2.9 RECORD PROJECT WARRANTIES MANUAL SUBMITTAL

- A. Content: All required Warranties, Bonds, Maintenance Service Agreements, Certifications, and similar documents.
- B. Paper Copy of Project Warranties Manual:
1. Organize documents into an orderly sequence based on the table of contents of Project Manual and Specification Section Numbers.
 2. Bind content in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11 inch paper. Entire cover and spine to have integral clear plastic sleeve with open top for insertion of printed identification information.
 3. First page to be title page with identification information.
 4. Second page to be Table of Contents listing each document. Main headings in table of contents to be Specification Section Number and Title. Inset below each main heading the identification of the document and number in sequence as follows:
 - a. Number prefix to be Section Number (without spaces), followed by two-digit sequence number.
 - b. Examples: 044200-01; 044200-02; etc. 081416-01; 081416-02; etc.
 - c. Divider tab insert numbers to match table of content numbers.
 5. Provide heavy bond divider tabs with plastic-covered insert tabs for each separate document.
 6. In front of each document, insert a page with the following content:
 - a. Specification Number and Title.
 - b. Description of the product, equipment, or construction element to which the document is related.
 - c. Name, address, and telephone number of Installer.
 7. Identify each binder on the front and spine with script as follows:
 - a. PROJECT WARRANTIES MANUAL
 - b. Project name and ID number(s).
 - c. Contractor name, address, and telephone number.
 8. For Final Submittal of Project Warranties Manual:

- a. Contractor is responsible for acquiring all information and signatures to affect full execution of documents, including from Owner when required, prior to final submittal.
 - b. All commencement dates are to be the Date of Project Acceptance, unless previously agreed upon otherwise in writing by Owner and Contractor. Such written agreement must be included with documentation.
 - c. Documents to be finalized original documents with all information filled in including commencement and expiration dates and certification signatures and dates by all parties.
- C. Electronic Copy of Project Warranties Manual:
1. PDF single file format on digital media device; labeled with identification information.
 2. Content to be the same and organized in like manner as described for Paper Copy of Project Warranties Manual.
 3. Digital file to include bookmarked panel with digitally hyperlinked bookmarks duplicating the Table of Contents for digital navigation to contents.

PART 3 EXECUTION

3.1 STAIRS AND RAMPS COMPLIANCE CERTIFICATION

- A. Provide survey services to survey and certify that all interior and site constructed stairs and ramps are compliant with current applicable building codes and the Americans With Disabilities Act (ADA). Engage a professional registered surveyor or engineer to conduct survey, document survey data, and certify that survey data indicates compliance as indicated.
1. Documentation data is to include drawing indicating locations of stairs and ramps surveyed with locations keyed to survey data.
 2. Surveyor or engineer to be qualified and experienced to provide the required service and is to be registered in the State in which project is located.
 3. Documentation data and compliance certification to be sealed by the professional registered surveyor or engineer.
- B. Correct construction found to be noncompliant with requirements indicated. When complete re-engage professional service provider to complete compliance certification.
- C. Closeout Submittal: Submit the sealed Stairs and Ramps Compliance Certification as indicated in this Section for Records Certifications Submittals.

END OF SECTION

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

- A. Digital Media Device: Digital media drive device, readable with current Microsoft operating system software. Digital files are to allow for reviewer comments and markup to be added.

1.4 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products.
 2. Attendance List: For each training module, provide list of Owner's intended participants.

1.5 CLOSEOUT SUBMITTALS

- A. General Requirements:
1. Submit records and documentation of required demonstration and training program/modules and actual training events for Owner. Comply with the requirements indicated in the SUBMITTAL - DEMONSTRATION AND TRAINING MANUAL article in this Section.
- B. Initial Demonstration And Training Manual Submittal:
1. Paper Copy Format: Submit one photocopy of Manual.
 2. Electronic Copy Format: Submit two (2) on digital media devices.
 3. Submittal time to be as indicated in Section 01 77 00 - Closeout Procedures.
- C. Final Demonstration And Training Manual Submittal:
1. Paper Copy Format: Submit one final Manual and one photocopy Manual.
 2. Electronic Copy Format: Submit two (2) on digital media devices.
 3. Submittal time to be as indicated in Section 01 77 00 - Closeout Procedures.

1.6 QUALITY ASSURANCE

- A. Pre-Instruction Meeting: A minimum of seven (7) days prior to commencing training sessions, conduct meeting at Project site. Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss work items, locations and facilities requiring instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, facilities needed to avoid delays, and training attendees.
 - 3. Review required content of instruction for training modules.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.
 - 5. Review training documentation requirements.

1.7 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate with Owner to acquire list of Owner's intended participants for each training module.
- C. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- D. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals.
- E. Do not submit instruction program until operation and maintenance data has been submitted, reviewed and approved by Architect. Refer to Section 01 78 23 - Operation and Maintenance Data.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each Training Module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor has delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.

- g. Limiting conditions.
 - h. Performance curves.
 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning.
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.

- e. Review of spare parts needed for operation and maintenance.

3.2 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module information. Assemble training modules into a training manual to be provided to the training attendees.
- B. Prior to time established to begin instruction, set up instructional equipment at instruction location.

3.3 INSTRUCTION

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner, through Architect, with at least seven days' advance notice.
- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- D. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.4 SUBMITTAL - DEMONSTRATION AND TRAINING MANUAL

- A. Content: Records and documentation of required demonstration and training programs/modules and actual training events for Owner.
- B. Paper Copy of Demonstration And Training Manual:
 - 1. Organize documents into an orderly sequence based on each Training Module and in order of the subject matter Specification Section Numbers.
 - 2. Bind content in 8-1/2 by 11 inch heavy-duty, three-ring, vinyl-covered, loose-leaf binders(s); thickness as necessary to accommodate contents; and clear plastic sleeved DVD ring binder storage page(s) for DVD content inclusion. Entire cover and spine to have integral clear plastic sleeve with open top for insertion of printed Manual identification information.
 - 3. Manual first page to be title page with identification information.
 - a. Manual Title: DEMONSTRATION AND TRAINING MANUAL.
 - b. Name of Project and Project Number.
 - c. Name of Architect.
 - d. Name of Construction Manager (if any).
 - e. Name of Contractor.
 - f. Name of Subcontractor.
 - 4. Manual second page to be Table of Contents listing each Training Module. Main headings in table of contents to be Specification Section Number and Title. Inset below each main heading the identification of each Training Module.
 - 5. Manual second page to be Table of Contents listing each Training Module. Main headings in table of contents to be Specification Section Number and Title. Inset below each main heading the identification of each Training Module.
 - a. INSTRUCTION PROGRAM - OVERVIEW
 - 1) (Subheading to follow, if any)

- 2) (Subheading to follow, if any)
 - b. TRAINING MODULE - (Section Number and Title for each module)
 - 1) (Subheading to follow, if any)
 - 2) (Subheading to follow, if any)
 6. Provide heavy bond divider tabs with plastic-covered insert tabs for each separate Training Module set of records.
 7. Individual Training Module records: Order of insertion to be as indicated.
 - a. In front of each Training Module, insert a page with the following content:
 - 1) Specification Section Number and Title.
 - 2) Description of the Training Module and bullet list of product, equipment or construction element to which the documentation is related.
 - 3) Name, address, and telephone number of Installer and Instructor.
 - b. Documentation of Owner attendees that attended training session.
 - c. Documentation of Training Module developed as part of the Instructional Program.
 - d. Documentation of actual training session, including additional information disseminated or generated during training session.
 - e. If training video(s) was viewed during the training session, indicate so by video title(s) and include the labeled digital media device.
 - f. If video record of the training session is required, or produced without requirement, include the labeled digital media device.
- C. Electronic Copy of Demonstration And Training Manual:
1. PDF single file format on digital media device; labeled with identification information.
 2. Content to be the same and organized in like manner as described for Paper Copy of Demonstration And Training Manual.
 3. Digital file to include bookmarked panel with digitally hyperlinked bookmarks duplicating the Table of Contents for digital navigation to contents.
 4. Include video recordings as separate files on Manual media digital device; hyperlinked to references in the Manual; playable by mouse click on hyperlinked references.
- D. Closeout Submittal: Manual in accordance with requirements indicated in Section 01 77 00 - Closeout Procedures.

END OF SECTION

SECTION 02 41 13
SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY

- A. This Section includes the following:
1. Demolition and removal of existing asphalt and/or concrete pavement, concrete and/or asphalt walks, curbs and gutters, and other exterior site items indicated or not indicated which interfere with the Work.
 2. Removal and/or relocation of existing underground utilities.
 3. Removal and disposal of existing sanitary sewer pipe, water pipe, storm drainage pipe and appurtenances indicated. Filling of existing pipes to be abandoned in place.
 4. Removal and replacement of fencing and playground equipment.
 5. Removal and relocation of existing light poles.
 6. Removal and disposal of material from dump areas.

1.3 DEFINITIONS

- A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
- B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.
- D. Existing to Remain: Protect items indicated to remain against damage and soiling. When permitted by the Architect, items may be removed to a suitable, protected storage location and then cleaned and reinstalled in their original locations.

1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, remove demolished materials from the site with further disposition at the Contractor's option.

- B. Storage or sale of removed items or materials on-site will not be permitted.
- C. Historical items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner, which may be encountered, remain the Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner.

1.5 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by the Work.
- B. Record drawings at Project closeout.
 - 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.
- C. Proposed dust-control measures.
- D. Schedule of selective demolition activities indicating the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
 - 2. Interruption of utility services.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
 - 6. Locations of temporary partitions and means of egress.
- E. Inventory of items to be removed and salvaged or turned over to Owner.
- F. Landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: All work shall comply with Federal, State and Local laws and regulations concerning hauling and disposal of demolition debris.
- B. Notify the proper agencies prior to the start of work and obtain all necessary permits for this work.

1.7 PROJECT CONDITIONS

- A. Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner to the extent practical. However, minor variations may occur due to Owner's removal and salvage operations prior to the start of demolition work.
- B. The location of existing underground utilities indicated is approximate only. Field locate all existing underground utilities in the area of work, regardless of whether or not they are indicated. Call NC one call at 1-800632-4949 prior to the start of demolition work for assistance in the location of existing underground utilities.
- C. Should charted, uncharted or incorrectly charted utilities be encountered during demolition, contact the Architect immediately for instructions. Cooperate with Owner and utility companies to keep services and facilities in operation.
- D. Do not interrupt existing utilities serving facilities occupied and used by the Owner and others, except when permitted in writing by the Owner. Provide acceptable temporary utility service as required to maintain Owner's operations.

1.8 SCHEDULING

- A. Owner will occupy portions of the building immediately adjacent to the Work. Conduct selective demolition so that the Owner's operations will not be disrupted. Provide not less than 72 hours notice to Owner of activities that will affect Owner's operations.
- B. Arrange selective demolition schedule so as not to interfere with Owner's on-site operations.
- C. Notify and coordinate any required relocation and/or removal of existing underground utilities, poles, meters or other above ground appurtenances with the appropriate utility company (i.e. power, telephone, cable and natural gas/propane) prior to the start of selective demolition work.

1.9 PAYMENT FOR UTILITY REMOVAL / RELOCATIONS

- A. Electric Service – Contractor to coordinate with owner.
- B. Phone Service
- C. Cable Television
- D. Gas
- E. Fiber Optic Lines

1.10 USE OF EXPLOSIVES

- A. Do not use explosives to perform selective site demolition work.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Call NC one call at 1-800632-4949 prior to the start of demolition work for assistance in the location of existing underground utilities. Field locate all existing underground utilities in the area of work, regardless of whether or not they are indicated.
- B. Should uncharted or incorrectly charted existing utilities be identified, contact the Architect immediately for instructions. Provide a scale drawing with the location of the uncharted or incorrectly charted utilities for use by the Architect in preparing additional direction.
- C. Verify that utilities indicated as removed, abandoned and/or relocated have been disconnected and capped.
- D. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- E. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged and turned over to the Owner.

3.2 PROTECTION OF PERSONS AND PROPERTY

- A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
 - 1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
- D. Barricade areas of demolition occurring as part of this work, and post with warning lights as required by authorities having jurisdiction.

- E. Protect structures, buildings, utilities, walks, pavements, existing vegetation and other facilities to remain from damage caused by settlement, lateral movement, undermining, washout and other hazards created by demolition operations.

3.3 POLLUTION CONTROLS

- A. Perform all work in accordance with the requirements of the latest edition of the North Carolina Erosion and Sediment Control Planning and Design Manual and those of the local Erosion Control official.
- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by the Work. Return adjacent areas to condition existing before start of selective demolition.

3.4 DEMOLITION OF EXISTING FACILITIES

- A. Electric Service
 - 1. Coordinate the removal and/or relocation of existing utilities with Power Company.
 - 2. Contact Progress Energy at 800-452-2777 to arrange for required removal and/or relocation of existing service.
- B. Phone Service
 - 1. Coordinate the removal and/or relocation of existing utilities with applicable Phone Company.
 - 2. Contact applicable Phone Company Representative to arrange for required removal and/or relocation of existing service.
- C. Cable Television
 - 1. Coordinate the removal and/or relocation of existing utilities with applicable Cable Company.
 - 2. Contact applicable Cable Company Representative to arrange for required removal and/or relocation of existing service.
- D. Gas
 - 1. Coordinate the removal and/or relocation of existing utilities with Gas Company.
 - 2. Contact Piedmont Natural Gas Company at 1-800-752-7504 to arrange for required removal and/or relocation of existing service.
- E. Fiber Optic Lines
 - 1. Coordinate the removal and/or relocation of existing utilities as needed with applicable Fiber Optic Company.
 - 2. Contact applicable Fiber Optic Company Representative to arrange for required removal and/or relocation of existing service.

F. Utilities

1. Coordinate the removal and/or relocation of existing utilities with the appropriate utility companies.
2. Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and to local jurisdictional codes.
3. Provide adequate means of support and protection during demolition and other construction operations for existing utilities that are to remain in place. Repair utilities damaged by construction operations to the satisfaction of the utility owner.

G. Asphalt Pavement

1. Remove asphalt concrete pavement by sawcutting to the full depth of the pavement. Provide neat sawcuts at the limits of pavement removal indicated.

H. Concrete Pavement, Walks and Curbs

1. Remove concrete pavement and walks to the nearest joint. Sawcut concrete if joints are not present adjacent to the area of demolition.
2. Sawcut concrete along straight lines to a depth of not less than 2 inches. Break out remainder of concrete, provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or sawcut entirely through concrete.

I. Light Poles

1. Remove and relocate light poles as indicated. If light poles are owned by a public utility, coordinate the relocation with them.

J. Fencing

1. Remove existing chain-link fencing as indicated on the drawings.
2. Turn fencing materials removed over to the Owner.

K. Playground Equipment

1. Remove, store and protect existing playground equipment interfering with proposed construction.
2. Turn play equipment over to the Owner for reinstallation following the completion of construction in the area.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

- B. Do not burn demolished materials or debris.
- C. Transport and legally dispose of demolished materials off of Owner's property.

3.6 CLEANUP AND REPAIR

- A. Upon completion of demolition work remove all tools, equipment and demolition materials from site. Remove demolition work area protection and leave areas clean.
- B. Repair any demolition performed in excess of that required. Return elements of construction and surfaces to remain to the condition existing prior to the start of construction. Repair adjacent construction or surfaces soiled or damaged by demolition work.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete for the following:
1. Slabs on grade.
 2. Footings.
 3. Concrete stairs
 4. Mechanical equipment pads and housekeeping pads.
 5. Control, expansion and contraction joint devices.

1.2 REFERENCES

- A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
 2. ACI 305 - Hot Weather Concreting.
 3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
 4. ACI 308.1 - Standard Specification for Curing Concrete.
 5. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM International:
1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 3. ASTM C33 - Standard Specification for Concrete Aggregates.
 4. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 5. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 6. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
 7. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
 8. ASTM C150 - Standard Specification for Portland Cement.
 9. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
 10. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
 11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 12. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
 13. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
 14. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
 15. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
 16. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
 17. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
 18. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.

19. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
20. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
21. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
22. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
23. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
24. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
25. ASTM C1218 - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
26. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
27. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
28. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
29. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
30. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
31. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
32. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
33. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
34. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.3 PERFORMANCE REQUIREMENTS

- A. Vapor Barrier Permeance: testing results from ASTM F 1249 or ASTM E 96 must state a water vapor transmission rate (WVTR) of less than 0.01 perms (grains/[hour * ft² * in. Hg])

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on joint devices, attachment accessories and admixtures.
- C. Design Data:
 1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
 - a. Hot and cold weather concrete work.
 - b. Air entrained concrete work.
 2. Identify mix ingredients and proportions, including admixtures.
 3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.
- D. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.5 CLOSEOUT SUBMITTALS

- A. Section 017700 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301 and ACI 318.
- B. Conform to ACI 305 when concreting during hot weather.
- C. Conform to ACI 306.1 when concreting during cold weather.
- D. Acquire cement and aggregate from one source for Work.

1.7 COORDINATION

- A. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, and as follows:
 - 1. Type I, except where other type is specifically permitted or required.
 - a. Type I may be replaced by Type III (high early strength) for concrete placed during cold weather.
- B. Fly Ash: ASTM C 618, Type C or F.
 - 1. Maximum allowable loss on ignition: 4.0 percent.
- C. Water: Potable.
- D. Aggregates:
 - 1. Normal weight concrete: ASTM C 33, uniformly graded as follows:
 - a. Class: Moderate weathering region, but not less than 3M
 - b. Nominal Maximum Aggregate Size:
 - 1) Slabs on Grade: 1-inch.
 - 2) Footings and Walls: 3/4-inch.
 - 2. Lightweight Aggregate: ASTM C330, 3/4-inch nominal maximum aggregate size.
- E. Admixtures - General: Admixtures which result in more than 0.1 percent of soluble chloride ions by weight of cement are prohibited.
- F. Air-Entraining Admixture: ASTM C 260 and certified by manufacturer for compatibility with other mix components.
- G. Water-Reducing Admixture: ASTM C 494, Type A.
- H. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
- I. Water-Reducing and Accelerating Admixtures: ASTM C 494, Type E.

2.2 REINFORCEMENT

- A. Deformed Reinforcement: ASTM A615/A615M; 60 ksi yield strength, steel bars, unfinished.

2.3 REINFORCEMENT ACCESSORY MATERIALS

- A. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor retarder puncture.
- B. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic tipped steel type; size and shape to meet Project conditions.

2.4 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Vapor Barrier
 - 1. Vapor barrier must have all of the following qualities:
 - a. Permeance of less than 0.01 Perms [grains/(ft² · hr · inHg)] as tested in accordance with ASTM E 1745 Section 7.1.
 - b. Other performance criteria:
 - 1) Strength: ASTM E 1745 Class A.
 - 2) Thickness: 15 mils
 - c. Manufactured from prime virgin resins.
 - 2. Seam Tape: Manufacturer's recommended low permeance tape composed of a high-density polyethylene film and a rubber based, pressure-sensitive adhesive.
- B. Nonshrink Grout: ASTM C 1107.
 - 1. Type: Provide nonmetallic type only.
 - 2. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Nonmetallic type:
 - 1) "Masterflow 928"; Master Builders, Inc.
 - 2) "SonogROUT 14k"; Sonneborn Building Products Division/ChemRex, Inc.
 - 3) "Euco N-S Grout"; The Euclid Chemical Company.
 - 4) "Supreme"; Cormix Construction Chemicals.
 - 5) "Crystex"; L & M Construction Chemicals, Inc.
 - 6) "Sure-Grip High Performance Grout"; Dayton Superior Corporation.
 - 7) "Horn Non-Corrosive Non-Shrink Grout"; A. C. Horn, Inc.
 - 8) "Five Star Grout"; Five Star Products, Inc.
- C. Burlap: AASHTO M 182, Class 2 jute or kenaf cloth.
- D. Moisture-Retaining Cover: ASTM C 171, and as follows:
 - 1. Curing paper.
 - 2. Polyethylene film.
 - 3. White burlap-polyethylene sheeting.
- E. Liquid Curing Compounds:
 - 1. Manufacturers: Provide products complying with requirements of the contract documents and made by one of the following:
 - a. Master Builders, Inc.
 - b. Anti Hydro International, Inc.
 - c. The Euclid Chemical Company.
 - d. A. C. Horn, Inc.
 - e. Dayton Superior Corporation.
 - f. W. R. Meadows, Inc.
 - g. The Burke Company.
 - h. Sonneborn Building Products Division/ChemRex, Inc.

- i. L & M Construction Chemicals, Inc.
 - j. Setcon Industries, Inc.
 - k. Cormix, Inc.
 2. Material - curing compounds: Comply with ASTM C 309, Type 1.
 - a. Non-yellowing formulation where subject to ultraviolet light.
 - b. Where compounds are proposed for use on surfaces to which finishes, coatings, or coverings subsequently will be applied, compound shall possess demonstrated compatibility with finish, coating, or covering, and use shall be subject to approval of the architect.
 - c. Curing and sealing compound: Where indicated, provide curing and sealing formulation with long-lasting finish that is resistant to chemicals, oil, grease, deicing salts, and abrasion.
 3. Solvents: Water-based products where used on interior surfaces.
- F. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Volclay Waterstop-RX;
 - b. Colloid Environmental Technologies Co.
 - c. Conseal CS-231; Concrete Sealants Inc.
 - d. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.
 - e. Hydrotite; Greenstreak.
 - f. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
 - g. Adeka Ultra Seal; Mitsubishi International Corporation.
 - h. Superstop; Progress Unlimited Inc.
- G. Underlayment Compound: Self-leveling cementitious compound designed for pumping.
 1. Products: Provide one of the following:
 - a. "Flo-Top"; The Euclid Chemical Company.
 - b. "Thoro Underlayment Self-Leveling"; Thoro System Products Division/ICI Americas.
- H. Expansion Joint Filler:
 1. Interior - Nonextruding bituminous type: ASTM D 1751.
 2. Exterior - Sponge rubber type: ASTM D 1752, Type I.

2.5 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the 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 mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 1. Fly Ash: 25 percent, for concrete exposed to weather.
- C. Limit water-soluble, chloride-ion content in hardened concrete, measured by percent by weight of cement, as follows:
 1. Concrete slabs exposed to weather. 0.30.
 2. Concrete protected from weather: 1.00.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete and concrete with a water-cementitious materials ratio below 0.50.

2.6 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: 3000 psi at 28 days.
 2. Slump Limit: 4 inches, plus or minus 1 inch.
- B. Slabs-on-Grade, protected from weather: Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: 3000 psi at 28 days.
 2. Minimum Cementitious Materials Content: 520 lb/cu. yd. for 1 inch maximum aggregate size or 540 lb/cu. yd. for $\frac{3}{4}$ inch maximum aggregate size.
 3. Slump Limit: 4 inches, plus or minus 1 inch.
 4. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
- C. Slabs-on-Grade, exposed to weather: Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: 4500 psi at 28 days.
 2. Minimum Cementitious Materials Content: 520 lb/cu. yd. for 1 inch maximum aggregate size; 540 lb/cu. yd. for $\frac{3}{4}$ inch maximum aggregate size.
 3. Slump Limit: 4 inches, plus or minus 1 inch.
- D. Slump: A tolerance of up to 1 inch above approved design mix slump will be permitted for 1 batch in 5 consecutive batches tested. Concrete of lower slump than that specified may be used, provided proper placing and consolidation is obtained.
- E. Total Air Content: A tolerance of plus or minus 1-1/2 percent of approved design mix air content will be allowed for field measurements.
- F. Do not use batches that exceed tolerances.

2.7 CONCRETE MIXING

- A. Transit Mixers: Mix concrete materials in transit mixers, complying with requirements of ASTM C 94.
 1. At ambient temperatures of 85 to 90 degrees F, reduce mixing and delivery time to 75 minutes.
 2. At ambient temperatures above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013100 - Administrative Requirements: Coordination and project conditions.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with epoxy grout.
- C. Remove debris and ice from formwork, reinforcement, and concrete substrates.
- D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301 and ACI 318.
- B. Notify testing laboratory and Architect/Engineer minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- D. Install vapor barrier under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends.
- E. Repair vapor barrier damaged during placement of concrete reinforcing. Repair with vapor barrier material; lap over damaged areas minimum 6 inches and seal watertight.
- F. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- G. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor and wall finish.
- H. Install joint covers in longest practical length, when adjacent construction activity is complete.
- I. Apply sealants in joint devices in accordance with Section 07920.
- J. Deposit concrete at final position. Prevent segregation of mix.
- K. Place concrete in continuous operation for each panel or section determined by predetermined joints.
- L. No free falls in excess of 3 feet shall be permitted. For falls in excess of 3 feet, chutes or elephant trunks shall be employed.
- M. Concrete shall be thoroughly compacted during placing and thoroughly worked around reinforcing and embedded fixtures and into the corners of the form. Vibration shall be employed to aid the compaction of the concrete under experienced supervision. Forms shall be designed to withstand their action. Supplement vibration by spading. No forking and/or raking shall be permitted. At least one spare vibrator shall be on hand for emergency use.
- N. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- O. Place concrete continuously between predetermined expansion, control, and construction joints.
- P. Do not interrupt successive placement; do not permit cold joints to occur.
- Q. No concrete that has partially hardened, become contaminated by foreign materials, or has been re-tempered shall be deposited.

- R. Place floor slabs in saw cut pattern indicated.
- S. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.
- T. Screed floors and slabs on grade level, maintaining surface flatness of maximum ¼ inch in 10 ft.
- U. Provide control joints in concrete terrazzo flooring per NTMA recommendations and as follows: Provide control joints at no more than 6'-0" on center. Provide control joints at all corner locations. Coordinate joint locations with Architectural documents.
- V. For pumped concrete, grout used to prime the pump shall be not be used on the project.

3.4 FINISHING SLABS

- A. Finishing Operations - General:
 - 1. Do not directly apply water to slab surface or dust with cement.
 - 2. Use hand or powered equipment only as recommended in ACI 302.1R.
 - 3. Screeding: Strikeoff to required grade and within surface tolerances indicated. Verify conformance to surface tolerances. Correct deficiencies while concrete is still plastic.
 - 4. Bull Floating: Immediately following screeding, bull float or darby before bleed water appears to eliminate ridges, fill in voids, and embed coarse aggregate. Recheck and correct surface tolerances.
 - 5. Do not perform subsequent finishing until excess moisture or bleed water has disappeared and concrete will support either foot pressure with less than 1/4-inch indentation or weight of power floats without damaging flatness.
 - 6. Final floating: Float to embed coarse aggregate, to eliminate ridges, to compact concrete, to consolidate mortar at surface, and to achieve uniform, sandy texture. Recheck and correct surface tolerances.
 - 7. Troweling: Trowel immediately following final floating. Apply first troweling with power trowel except in confined areas, and apply subsequent trowelings with hand trowels. Wait between trowelings to allow concrete to harden. Do not over trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over it. Consolidate concrete surface by final troweling operation. Completed surface shall be free of trowel marks, uniform in texture and appearance, and within surface tolerance specified.
 - 8. Grind smooth surface defects which would telegraph through final floor covering system.
- B. Coordinate appearance and texture of required final finishes with the architect before application.
- C. Float Finish: As specified above.
- D. Broomed Float Finish: After floating and when water sheen has practically disappeared, apply uniform transverse corrugations approximately 1/16 inch deep, without tearing surface.
- E. Trowel Finish: As specified above.
- F. Trowel and Fine Broom Finish: Follow trowel finishing operation immediately with fine brooming to achieve slightly scarified surface.
- G. Slab Surface Tolerances:
 - 1. Achieve flat, level planes except where grades are indicated. Slope uniformly to drains.

2. Floated finishes: Depressions between high spots shall not exceed 1/4 inch under a 10-foot straightedge.
 3. Troweled finishes: Achieve level surface plane so that depressions between high spots do not exceed the following dimension, using a 10-foot straightedge:
 - a. 1/8 inch non-cumulative in any direction and equivalent to FF25 (floor flatness), FL20 (floor levelness) at areas to receive wood flooring and special sports flooring as noted in Division 9.
 - b. 3/16 inch all others receiving troweled finishes.
- H. Slab Finish Schedule: Apply finishes in the following typical locations and as otherwise shown on the drawings:
1. Float finish:
 - a. Surfaces to receive thickset stone flooring
 2. Broomed float:
 - a. Sidewalks.
 - b. Exterior slabs not otherwise scheduled.
 3. Trowel finish:
 - a. Exposed interior floors not otherwise scheduled.
 - b. Surfaces to receive resilient tile.
 - c. Surfaces to receive carpet.
 4. Trowel and fine broom:
 - a. Surfaces to receive thinset tile.
 5. Finish of all slabs to receive terrazzo shall be coordinated with terrazzo installer.
- I. Repair of Slab Surfaces: Test slab surfaces for smoothness and to verify surface plane to tolerance specified. Repair defects as follows:
1. High areas: Correct by grinding after concrete has cured for not less than 14 days.
 2. Low areas: Immediately after completion of surface finishing operations, cut out low areas and replace with fresh concrete. Finish repaired areas to blend with adjacent concrete. Proprietary patching compounds may be used when approved by the architect.
 3. Crazed or cracked areas: Cut out defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts. Dampen exposed concrete and apply bonding compound. Mix, place, compact, and finish patching concrete to match adjacent concrete.
 4. Isolated cracks and holes: Groove top of cracks and cut out holes not over 1 inch in diameter. Dampen cleaned concrete surfaces and apply bonding compound; place dry pack or proprietary repair compound acceptable to architect while bonding compound is still active:
 - a. Dry-pack mix: One part portland cement to 2-1/2 parts fine aggregate and enough water as required for handling and placing.
 - b. Install patching mixture and consolidate thoroughly, striking off level with and matching surrounding surface. Do not allow patched areas to dry out prematurely.
 5. Underlayment: Leveling of slabs for subsequent application of floor finishes may be achieved by use of specified underlayment material, at contractor's option.
- J. Surface Sealer: Apply to all interior concrete slabs to remain exposed.
1. Allow concrete to cure for 30 days prior to application of sealer.
 2. Use clear solvent base, 100% solid epoxy sealer similar to Tamms Duraltex 1705. Apply two coats. Follow manufacturers recommendation for surface preparation.

3.5 CONCRETE CURING AND PROTECTION

- A. General:
 - 1. Prevent premature drying of freshly placed concrete, and protect from excessively cold or hot temperatures until concrete has cured.
 - 2. Provide curing of concrete by one of the methods listed and as appropriate to service conditions and type of applied finish in each case.
- B. Normal Curing Period:
 - 1. Not less than 7 days for standard cements and mixes.
 - 2. Not less than 4 days for high early strength concrete using Type III cement.
- C. Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed.
 - 1. Keep wooden or metal forms moist when exposed to heat of the sun.
 - 2. If forms are removed prior to completion of curing process, continue curing by one of the applicable methods specified.
- D. Surfaces Not in Contact with Forms:
 - 1. Start initial curing as soon as free water has disappeared, but before surface is dry.
 - 2. Keep continuously moist for not less than 7 days by uninterrupted use of any of the following:
 - a. Water ponding.
 - b. Water-saturated sand.
 - c. Water-fog spray.
 - d. Saturated burlap: Provide 4-inch minimum overlap at joints.
 - 3. Begin final curing procedures immediately following initial curing and before concrete has dried.
 - a. Moisture-retaining cover: Lap not less than 3 inches at edges and ends, and seal with waterproof tape or adhesive. Repair holes or tears during curing period with same tape or adhesive. Maintain covering in intimate contact with concrete surface. Secure to avoid displacement.
 - 1) Extend covering past slab edges at least twice the thickness of slab.
 - 2) Do not use plastic sheeting on surfaces which will be exposed to view when in service.
 - b. Curing compound: Apply at rate stated by manufacturer to conform with moisture-retention requirements specified, using second, immediate application at right angles to first, if necessary, and reapply if damaged by rain.
 - c. Curing and sealing compound: Apply at rate stated by manufacturer to conform with moisture-retention requirements specified, using second, immediate application at right angles to first, if necessary, and reapply if damaged by rain. Apply additional coat near substantial completion to act as sealer.
 - d. Use curing compounds only in locations permitted or required, and where use will not interfere with other finishes, coatings, or coverings to be applied.
 - 4. Continue final curing to end of curing period.
- E. Avoid rapid drying at end of curing period.
- F. During and following curing period, protect concrete from temperature changes of adjacent air in excess of 5 degrees F per hour and 50 degrees F per 24 hours. Progressively adjust protective measures to provide uniform temperature changes over entire concrete surface.

3.6 MISCELLANEOUS CONCRETE ITEMS

- A. Fill-in: Fill in holes and openings left in concrete structures for passage of work by other trades after such work is in place. Place such fill-in concrete to blend with existing construction, using same mix and curing methods.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as indicated on drawings. Set anchor bolts at correct elevations, complying with diagrams or templates of equipment manufacturer.
 - 1. Grout base plates and foundations as indicated with nonshrink grout.
 - 2. Use nonmetallic grout for exposed conditions, unless otherwise indicated.
- C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Screed, tamp, and finish concrete surfaces as scheduled.
- D. Reinforced Masonry: Provide concrete grout for reinforced masonry where indicated on drawings and as scheduled.

3.7 CONCRETE REPAIRS

- A. Perform cosmetic repairs of concrete surfaces as specified under concrete application.
- B. Perform structural repairs with prior approval of the architect for method and procedure, using epoxy bonding systems. The architect's approval is required for repair methods using materials other than those specified.

3.8 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Composite Sampling, and Making and Curing of Specimens: ASTM C 172 and ASTM C 31.
 - 1. Take samples at point of discharge.
 - 2. For pumped concrete, perform sampling and testing at the frequencies specified herein at point of delivery to pump, and perform additional sampling and testing at the same frequency at discharge from line. Results obtained at discharge from line shall be used for acceptance of concrete.
- B. Slump: ASTM C 143. One test per strength test and additional tests if concrete consistency changes.
 - 1. Modify sampling to comply with ASTM C 94.
- C. Air Content of Normal Weight Concrete: ASTM C 173 or ASTM C 231. One test per strength test performed on air-entrained concrete.
- D. Air Content of Lightweight Concrete: ASTM C 173. One test per strength test performed on air-entrained concrete.
- E. Approximate Air-Dry Weight of Lightweight Concrete: ASTM C 567. Determine fresh unit weight once per strength test and report approximate air-dry weight of concrete represented.
- F. Concrete Temperature:
 - 1. Test hourly when air temperature is 40 degrees F or below.
 - 2. Test hourly when air temperature is 90 degrees F or above.
 - 3. Test each time a set of strength test specimens is made.
- G. Compressive Strength Tests: ASTM C 39.
 - 1. Compression test specimens: Mold and cure one set of 4 standard cylinders for each compressive strength test required.
 - 2. Testing for acceptance of potential strength of as-delivered concrete:
 - a. Obtain samples on a statistically sound, random basis.

- b. Minimum frequency:
 - 1) One set per 100 cubic yards or fraction thereof for each day's pour of each concrete class.
 - 2) One set per 3500 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class.
 - 3) When less than 5 cubic yards is placed in one day, the architect may, at architect's option, waive laboratory testing of specimens if adequate evidence of satisfactory strength is provided. (Molding and curing of these specimens is not waived.)
 - 4) When the above testing frequency would provide fewer than 5 strength tests for a given class of concrete during the project, conduct testing from not less than 5 randomly selected batches, or from each batch if fewer than 5.
 - c. Test one specimen per set at 7 days for information unless an earlier age is required.
 - d. Test 2 specimens per set for acceptance of strength potential; test at 28 days unless other age is specified. The test result shall be the average of the two specimens. If one specimen shows evidence of improper sampling, molding, or testing, the test result shall be the result of the remaining specimen; if both show such evidence, discard the test result and inform the architect.
 - e. Retain one specimen from each set for later testing, if required.
 - f. Strength potential of as-delivered concrete will be considered acceptable if all of the following criteria are met:
 - 1) No individual test result falls below specified compressive strength by more than 500 psi.
 - 2) Not more than 10 percent of individual test results fall below specified compressive strength $f'(c)$.
 - 3) Average of any 3 consecutive strength test results equals or exceeds specified compressive strength $f'(c)$.
3. Removal of forms or supports: Mold additional specimens and field-cure with concrete represented; test to determine strength of concrete at proposed time of form or support removal.
- H. Test Results: Testing agency shall report test results in writing to architect and contractor within 24 hours of test.
- 1. Test reports shall contain the following data:
 - a. Project name, number, and other identification.
 - b. Name of concrete testing agency.
 - c. Date and time of sampling.
 - d. Concrete type and class.
 - e. Location of concrete batch in the completed work.
 - f. All information required by respective ASTM test methods.
 - 2. Nondestructive testing devices such as impact hammer or sonoscope may be used at architect's option for assistance in determining probable concrete strength at various locations or for selecting areas to be cored, but such tests shall not be the sole basis for acceptance or rejection.
 - 3. The testing agency shall make additional tests of in-place concrete as directed by the architect when test results indicate that specified strength and other concrete characteristics have not been attained.
 - a. Testing agency may conduct tests of cored cylinders complying with ASTM C 42, or tests as directed.

- b. Cost of additional testing shall be borne by the contractor when unacceptable concrete has been verified.

END OF SECTION

SECTION 03 35 43
POLISHED CONCRETE FINISHING

PART 1 GENERAL**1.1 SUMMARY**

- A. Section includes polished concrete system for concrete floors and slabs.
 - 1. Concrete surface treatments.
 - 2. Concrete joint filler.
 - 3. Concrete dye (stain).
 - 4. Concrete densifier (hardener).
 - 5. Concrete protective treatment.
- B. Related Requirements:
 - 1. Section 03 30 00 - Cast-in-Place Concrete: Finishing of concrete surface; curing.
 - 2. Section 07 90 00 - Joint Protection.

1.2 REFERENCE STANDARDS

- A. American Concrete Institute (ACI):
 - 1. ACI 310.1 - Specification for Polished Concrete Slab Finishes; 2020.
- B. ASTM International (ASTM):
 - 1. ASTM C1353/C1353M - Standard Test Method for Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform Abraser; 2020, with Editorial Revisions 2020.
 - 2. ASTM C1895 - Standard Test Method for Determination of Mohs Scratch Hardness; 2020.
 - 3. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2022.
 - 4. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Coating Systems; 2020.
 - 5. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness; 2015, Reapproval 2021.
 - 6. ASTM D4039 - Standard Test Method for Reflection Haze of High-Gloss Surfaces; 2009 Reapproval 2020.
 - 7. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2022.
 - 8. ASTM D5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image (DOI) Gloss of Coated Surfaces; 2018.
 - 9. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, Editorial Revisions 2023.
 - 10. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
 - 11. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2022.
 - 12. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
 - 13. ASTM G154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials; 2023.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination and pre-installation meeting.
- B. Coordination: Coordinate work of this Section with concrete floor placement and curing.
- C. Pre-installation Meeting: Conduct a pre-installation meeting 10 days prior to the start of work of this Section.
 - 1. Items for Review:
 - a. Physical requirements of completed concrete slab and slab finish.
 - b. Location and timing of test areas.
 - c. Protection of surfaces not scheduled for finish application.
 - d. Surface preparation.
 - e. Application procedure and quality control.
 - f. Cleaning and protection of finish.
 - g. Coordination with other work.
 - 2. Require attendance of parties directly affecting work of this Section, including:
 - a. Concrete installer.
 - b. Finish installer.
 - c. Contractor's representative.
 - d. Notify parties one week in advance of date and time of meeting.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
 - 1. Provide data on products, including limitations and interrelated compatibilities.
 - 2. Provide certification that products comply with regulations controlling use of volatile organic compounds.
- C. Samples for Initial Selections: Submit for Architect's initial selections, two manufacturer's sets of the following:
 - 1. Three (3) samples illustrating each of the three (3) classes of Polished Concrete Aggregate Exposure. Classes are indicated in ACI 310.1 - Table 3.2.3.1.
 - 2. Four (4) samples illustrating each of the four (4) levels of Polished Concrete Appearance DOI. Levels are indicated in ACI 310.1 - Table 3.2.4.1.
 - 3. Dye (Stain) Colors: Color chart samples illustrating full range of colors of dyed (stained) concrete.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit two samples of polished concrete (12 x 12 x 1 inches). Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- E. Maintenance Data: Provide data on maintenance and renewal of applied finishes.
- F. Manufacturer's qualifications statement.
- G. Installer's qualifications statement.

1.5 QUALITY ASSURANCE

- A. Comply with ACI 310.1 requirements.
- B. Comply with national, state, and local VOC regulations.
- C. Manufacturer Qualifications:
 - 1. Minimum five (5) years specializing in manufacturing products for polished concrete system specified in this Section.

- D. Installer Qualifications:
 - 1. Specializing in installing polished concrete system specified in this Section.
 - 2. Successfully completed minimum of five (5) projects of similar size and complexity.
 - 3. Approved by manufacturer of polished concrete system products.
 - 4. Concrete Polishing Council (CPC) Certification: Supervisor on site during work of this Section is to be CPC certified as CPC Craftsman.
- E. Testing and Inspection: Provide testing and inspection as indicated in PART 3 - EXECUTION of this Section.

1.6 MOCK-UP

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. Location:
 - 1. As directed by Architect.
 - a. Floor area to be approximately 50 sq ft.
- C. Accepted mock-up panel will be the basis of quality for the finished work. Mock-up is to be available for view during the work of this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials in manufacturer's sealed packaging, including application instructions.
- C. Store materials per manufacturer's recommendations and as follows:
 - 1. Store containers upright in cool, dry, well-ventilated place, out of the sun, at temperature between 40 degrees F (8 degrees C) and 100 degrees F (38 degrees C).
 - 2. Store away from other chemicals and potential sources of contamination.
 - 3. Keep lights, fire, sparks, and heat away from container. Protect from freezing.
 - 4. Do not drop containers or slide across sharp objects.
 - 5. Do not stack pallets more than three high.
 - 6. Keep containers tightly closed when not in use.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during, and after the work.
- B. Minimum requirements to be as recommended by product manufacturer unless requirements indicated in this Section are more stringent.
- C. Ambient Conditions: Maintain conditions a minimum of 8 hours before, during, and 8 hours after applications.
 - 1. Building shell to be sufficiently complete to keep out wind, rain, snow, and other adverse weather conditions that could damage the work.
 - 2. Provide lighting of 40 ft candles, or more, measured at the slab surface.
 - 3. Surface and air temperature to be between 50 degrees F and 95 degrees F.
 - 4. Provide adequate ventilation for work area.

1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Installer Warranty: Provide two (2) year warranty to correct defective work commencing on the date of Substantial Completion.
 - 1. Indicate Owner's name and register warranty with manufacturer.

PART 2 PRODUCTS

2.1 POLISHED CONCRETE SYSTEM

- A. Polished Concrete System: Materials, equipment, and procedures are to be as recommended by the Polished Concrete System manufacturer.
- B. Manufacturers:
 - 1. Ameripolish.
 - 2. Convergent Concrete Technologies.
 - 3. Prosoco, Inc.
 - 4. Substitutions: Section 01 60 00 - Product Requirements.
- C. Basis of Design:
 - 1. Prosoco - Consolideck Polished Concrete System.

2.2 CONCRETE SURFACE TREATMENTS

- A. Concrete Cutting Aid: Spray applied, clear, water-based blended surfactant cutting aid to extend the life of diamond tooling and minimize concrete surface scratches during the wet-grinding process.
- B. Concrete Repair Materials: Low-odor, liquid fill material to fill pinholes, small air voids, pop-outs, micro-cracks, scratches and other similar defects in concrete surface. Materials to be colored to match overall finished floor.
- C. Concrete Cleaner: Pre-densifier concrete cleaner to remove dirt, oil, grease, stains, and other contaminants from concrete substrate.

2.3 CONCRETE JOINT FILLER

- A. Comply with ACI 310.1 - Two-component, 100 percent solids, semi-rigid polyurea or epoxy that matches finished floor color and can be polished.
 - 1. Shore Hardness of the joint filler shall be dictated by floor use:
 - a. Pedestrian Traffic: Minimum Shore A Hardness of 60 when measured in accordance with ASTM D2240 and an elongation above 25 percent when measured in accordance with ASTM D638.
 - b. Hard-Wheeled Traffic -Minimum Shore A Hardness of 80 when measured in accordance with ASTM D2240 and an elongation above 25 percent when measured in accordance with ASTM D638.
 - 2. Use a stain prevention film or alternate stain prevention method to prevent staining or shadowing on slab surface from joint filler overfill.

2.4 CONCRETE DYE (STAIN)

- A. Non-film forming, water-carried, penetrating, translucent color dye that alters color and appearance of a concrete floor, providing consistent color and appearance.
- B. Basis of Design:
 - 1. Prosoco - Consolideck GemTone Stain.

2.5 CONCRETE DENSIFIER (HARDENER)

- A. Liquid Densifier: Penetrating chemical compound that reacts chemically with concrete, fills pores, increases surface hardness, increases resistance to abrasions and stains, and reduces dusting.
 - 1. Composition: Lithium Silicate.
 - a. Sodium silicate is not permitted.
 - 2. VOC Content: 50 g/L maximum.

3. Abrasion Resistance: Greater than 50 percent improvement compared to untreated sample in accordance with ASTM C1353/C1353M.
 4. Adhesion: Greater than 10 percent increase in pull-off strength compared to untreated sample when tested in accordance with ASTM D4541.
 5. Water Vapor Transmission: Zero perms compared to untreated samples when tested according to ASTM E96/E96M Method B.
 6. UV Stability: No degradation, peeling, blistering, chalking, or yellowing when tested in accordance with ASTM G154 after minimum of 500 hours UV exposure.
- B. Basis of Design:
1. Prosoco - Consolideck LS.

2.6 CONCRETE PROTECTIVE TREATMENT

- A. Protective Treatment: Penetrating protective treatment, non-film-forming material that penetrates polished and densified concrete surfaces, enhances gloss, and provides stain resistance.
1. Composition: Lithium silicate.
 2. VOC Content: 100 g/L or less.
 3. Stain Resistance: No adverse effect when tested according to ASTM D1308.
 4. UV Stability: No degradation, peeling, blistering, chalking, or yellowing when tested in accordance with ASTM G154 after minimum of 500 hours UV exposure.
- B. Basis of Design:
1. Prosoco, Inc. - Consolideck PolishGuard.

PART 3 EXECUTION

3.1 GENERAL

- A. Comply with ACI 310.1, and the manufacturer of the polished concrete system.
- B. Installer is to be approved by manufacturer of the polished concrete system.
- C. Concrete Polishing Council (CPC) Certification: Supervisor on site during work of this Section is to be CPC certified as CPC Craftsman.

3.2 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that surfaces are acceptable to receive the work of this section.
- C. Verify that flaws in concrete are patched and joints filled with methods and materials suitable for further finishes and allow complete curing of materials.
- D. Verify that surfaces are clean and free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- E. Verify that concrete surface hardness is greater than 4 Mohs Hardness in accordance with ACI 310.1 when tested in accordance with ASTM C1895.
- F. Testing: Verify that the concrete substrate's levels for alkalinity (pH), internal relative humidity, and moisture vapor emissions are within the limits recommended by the polished concrete system's manufacturer.
 1. Conduct tests by an independent testing agency acceptable to Owner.

2. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 8 pH and not more than 13 pH, unless recommended otherwise by manufacturer of polished concrete system.
 3. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level, unless recommended otherwise by manufacturer of polished concrete system.
 4. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture Vapor Emission Rate (MVER) from the slab is to be less than or equal to 5 lbs of water per 1,000 sf in 24 hours, unless recommended otherwise by manufacturer of polished concrete system.
- G. Do not proceed with installation work until noncompliant conditions have been corrected.

3.3 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect adjacent non-coated areas from drips, overflow, and overspray; avoid contact with metal, glass, and painted surfaces; immediately remove excess material.
- D. Correct variations in slab texture and color prior to application finish system requirements.

3.4 CONCRETE POLISHING

- A. Execute using materials, products, equipment, and polishing procedures in sequence and as required to produce final polished concrete system.
- B. Progressively grind, hone, polish, and burnish in multiple passes with each full pass in direction perpendicular to previous pass.
- C. Clean spills on slab surfaces immediately, with manufacturer's recommended chemicals and absorptive materials.
- D. Final Polished Concrete Characteristics:
 1. Aggregate Exposure: Comply with ACI 310.1 requirements indicated for Class and aggregate exposure.
 - a. Class A - Cement Fines: 85 to 95 percent cement fines. 5 to 15 percent sand aggregate.
 2. Distinction of Image (DOI) and Haze Index: Comply with ACI 310.1 requirements indicated for the DOI Level and Haze index as tested in accordance with the indicated referenced standards.
 - a. DOI Level 4 - Highly Polished: DOI clarity value 70 to 100 percent (ASTM D5767). Haze index less than 10 (ASTM D4039).
- E. Testing and Inspection: Provide testing and inspection that conforms to ACI 310.1. Coordinate with the Owner's testing and inspection agency. Prior to testing, clean floor surface with a non-etching cleaner to remove topical coatings and contaminants. Allow test surfaces to dry completely.
 1. Frequency of tests for each test type indicated:
 - a. Mock-up: One test.
 - b. Finished Polished Concrete: Three locations for areas up to 1,000 sf with one additional test for each 1,000 sf or fraction thereof.
 - 1) Test locations are to be selected by Architect.

- 2) In accordance with ANSI 310.1, test locations are to be selected by the Owner's testing agency, selected randomly in each test area, and the test areas are to be distributed across the entire polished floor.
2. DOI Level and Haze Index Testing: Test Distinction of Image (DOI) and Haze Index for compliance with values and standards indicated in this Section.

3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Defective Concrete: Repair or replace concrete not complying with required lines, details, dimensions, tolerances, or specified requirements at no additional cost to Owner.
- C. Match approved mock-ups for texture, appearance, and workmanship.
- D. No haze, white residue, streaking, or burnish marks permitted.

3.6 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.
- B. Clean surfaces soiled by work as recommended by manufacturer of soiled substrate.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect the work of this Section from damage.
- C. Comply with protection requirements of product manufacturer and ACI 310.1.

END OF SECTION

SECTION 04 05 03
MASONRY MORTARING AND GROUTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Mortar for masonry.
 - 2. Grout for masonry.
- B. Related Sections:
 - 1. Section 04 20 00 - Unit Masonry: Installation of mortar and grout.
 - 2. Section 04 72 00 - Cast Stone Masonry: Installation of mortar.
 - 3. Section 08 11 13 - Hollow Metal Doors and Frames: Products and execution for grouting steel door frames installed in masonry.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.
 - 2. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2024a.
 - 3. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
 - 4. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
 - 5. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
 - 6. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revisions.
 - 7. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar; 2023.
 - 8. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.
 - 9. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
 - 10. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2023.
 - 11. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
 - 12. ASTM C1019 - Standard Test Method for Sampling and Testing Grout for Masonry; 2020.
 - 13. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2022.
 - 14. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2023b.
 - 15. ASTM D1148 - Standard Test Method for Rubber Deterioration-Discoloration from Ultraviolet (UV) or UV/Visible Radiation and Heat Exposure of Light-Colored Surfaces; 2013; Reapproval 2018.
 - 16. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2020.
 - 17. ASTM E518/E518M - Standard Test Methods for Flexural Bond Strength of Masonry; 2022.
- B. The Masonry Society (TMS):
 - 1. TMS 402/602 - Building Code Requirements and Specification For Masonry Structures; 2022, with Errata.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also, include required environmental conditions and admixture limitations.
- C. Samples for Initial Selections: Three manufacturer's complete sets of color samples illustrating the finishes, textures, and colors available. Coordinated mortar finish, texture, and color requirements indicated on Drawings and in other Sections requiring masonry work. Submit for Architect's initial selections.
 - 1. Standard Masonry Mortar: Sample sets of manufacturer's full range.
 - 2. Colored Masonry Mortar:
 - a. Sample sets of manufacturer's full range.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, texture, and color; 3/8 x 4 inches in size. Samples to be same product to be used for the work. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- E. Test Reports:
 - 1. Submit reports on mortar indicating conformance of mortar to property requirements of ASTM C270 and test and evaluation reports per ASTM C780.
 - 2. Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C1019.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except when exceeded by requirements of the contract documents.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.
- C. Maintain materials and surrounding air temperature to minimum 40 degrees F and maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1 MORTAR AND GROUT APPLICATIONS

- A. Mortar: At Contractor's option, mortar may be field-mixed from packaged dry materials, made from factory premixed dry materials with addition of water only, or ready-mixed.
- B. Masonry Cement ASTM C91 IS NOT PERMITTED.
- C. Mortar Mix Designs: ASTM C270, Property Specification.
 - 1. Structural Masonry: Type S.
 - 2. Non-Structural Masonry: Type S.
 - 3. Repointing Masonry:
 - a. Match existing type, strength, composition, and color at cured stage.
- D. Mortar Colors:
 - 1. Standard Masonry Mortar: Standard Gray.
 - a. Sand Base: Buff.
 - b. Location: All masonry not indicated to be other color.
 - 2. Colored Masonry Mortar:
 - a. Color Range:
 - 1) Full Range: As selected by Architect from manufacture's full range.
 - a) Three colors.
 - b. Locations:
 - 1) As indicated on Drawings and in other Sections requiring masonry work.
- E. Grout Mix Designs:
 - 1. Structural Masonry: 3,000 psi strength at 28 days; 8-11 inches slump; provide ready-mixed type in accordance with ASTM C94/C94M.
 - a. Fine grout.
 - 2. Non-Structural Masonry: 2,000 psi strength at 28 days; 8-11 inches slump; provide ready-mixed type in accordance with ASTM C94/C94M.
 - a. Fine grout.

2.2 MATERIALS

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Type: As indicated for Mortar Mix Design in MORTAR AND GROUT APPLICATIONS article in this Section.
 - 2. Color: As required to produce approved mortar color sample(s).
- B. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.
 - 1. Type: Fine.
- C. Portland Cement: ASTM C150/C150M.
 - 1. Type: Type I - Normal; ASTM C150/C150M.
 - 2. Color: As required to produce approved mortar color sample(s).
- D. Hydrated Lime: ASTM C207, Type S.
- E. Mortar Aggregate: ASTM C144, standard masonry type.
 - 1. Color: As required to produce approved mortar color sample(s).
- F. Grout Aggregate: ASTM C404.

- G. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 - 1. Color: As required to produce approved mortar color samples(s).
- H. Water: Clean and potable.
- I. Bonding Agent: Latex type.

2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Colored Mortar: Proportion selected pigments and other ingredients to match approved mortar color sample(s), without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.
- D. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- E. Do not use anti-freeze compounds to lower the freezing point of mortar.
- F. If water is lost by evaporation, re-temper only within two hours of mixing.

2.4 GROUT MIXING

- A. Ready-mixed type grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.
- C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- D. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Request inspection of spaces to be grouted.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section. Prepare materials to be installed and equipment used during installation.
- B. Brace masonry to resist wet grout pressure.
- C. Remove excess mortar from grout spaces.
- D. Ensure that reinforcement is secured in required positions.
- E. Apply bonding agent to existing concrete surfaces where masonry units are set on concrete surfaces.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.

- B. Install mortar and grout to requirements of Section 04 20 00 - Unit Masonry and other section(s) in which masonry is specified.
- C. Work grout into masonry cores and cavities to eliminate voids.
- D. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.
- E. Do not displace reinforcement while placing grout.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Testing and inspection services.
- B. An independent testing agency will perform field tests.
- C. Test and evaluate mortar in accordance with ASTM C780 procedures for aggregate ratio and water content, air content, consistency, and compressive strength.
 - 1. Test frequency: Every 5,000 sf of completed wall area.
- D. Test and evaluate grout in accordance with ASTM C1019 procedures for compressive strength, and in accordance with ASTM C143/C143M for slump.
 - 1. Test frequency: Every 5,000 sf of completed wall area.

END OF SECTION

SECTION 04 20 00**UNIT MASONRY****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Concrete Masonry Units.
 - 2. Brick Masonry Units.
 - 3. Reinforcement and Anchorage.
 - 4. Accessories.

- B. Related Requirements:
 - 1. Section 01 21 00 - Allowances: Allowance(s) for brick.
 - 2. Section 04 05 03 - Masonry Mortaring and Grouting.
 - 3. Section 04 72 00 - Cast Stone Masonry.
 - 4. Division 05 - Metals: Structural steel, steel joists, metal fabrications, trusses, and metal framing requirements for metal anchors, bearing plates, and lintels to be placed by this Section.
 - 5. Section 07 21 19 - Foamed-In-Place Insulation: Insulation for masonry wall cavities.
 - 6. Section 07 62 00 - Sheet Metal Flashing and Trim: Product requirements for reglets for flashings to be placed by this Section.
 - 7. Section 07 84 00 - Firestopping: Firestopping at penetrations of masonry work.
 - 8. Section 07 90 00 - Joint Protection: Rod and sealant at control and expansion joints.
 - 9. Section 07 95 13 - Expansion Joint Cover Assemblies.
 - 10. Division 07 - Thermal and Moisture Protection: Dampproofing and waterproofing for masonry surfaces.
 - 11. Division 08 - Openings: Opening frames installed in or anchored to masonry work.

1.2 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 216.1 - Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies; 2014, Errata 2021.

- B. ASTM International (ASTM):
 - 1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
 - 2. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
 - 3. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
 - 4. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.
 - 5. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023.
 - 6. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
 - 7. ASTM C40/C40M - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete; 2020.
 - 8. ASTM C55 - Standard Specification for Concrete Building Brick; 2023.

9. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2023.
 10. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2023a.
 11. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.
 12. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2023.
 13. ASTM C142/C142M - Standard Test Method for Clay Lumps and Friable Particles in Aggregates; 2017, Reapproval 2023.
 14. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2023.
 15. ASTM C641 - Standard Test Method for Iron Staining Materials in Lightweight Concrete Aggregates; 2023.
 16. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength; 2022.
 17. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2023b.
 18. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017, Reapproval 2023.
 19. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2020.
 20. ASTM D2287 - Standard Classification System and Basis for Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds; 2019.
 21. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 22. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
 23. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2020.
- C. Brick Industry Association (BIA):
1. BIA Technical Note 20 - Cleaning Brickwork; 2018.
- D. Canadian Standards Association (CSA Group) (CSA):
1. CSA A82 - Fired Masonry Brick Made from Clay or Shale; 2018.
- E. The Masonry Society (TMS):
1. TMS 402/602 - Building Code Requirements and Specification For Masonry Structures; 2022, with Errata.
- F. Underwriters Laboratories Inc. (UL):
1. UL (FRD) - Fire Resistance Directory; Current Edition.
 2. UL 263 - UL Standard for Safety Fire Tests of Building Construction and Materials; Current Edition.
 3. UL 618 - UL Standard for Safety Concrete Masonry Units; Current Edition.
 4. UL 723 - UL Standard for Safety Test for Surface Burning Characteristics of Building Materials; Current Edition.

1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section.

1.4 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate masonry work with related work to include, but not limited to:
 - 1. Installation of anchors for windows, doors fixtures and other work requiring anchors to masonry work. door anchors.
 - 2. Electrical items and other built-in work.
 - 3. Mechanical ducts and dampers.
 - 4. Plumbing work items. Copper piping to be isolated from contact with cementitious materials as per code requirements.
 - 5. Foamed-in-place insulation and all waterproofing and air barrier design elements.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data:
 - 1. Submit data for masonry units and fabricated wire reinforcement, wall ties, anchors, and other accessories.
 - 2. Indicate initial rate of absorption for clay and shale brick.
- C. Samples for Initial Selections: Two manufacturer's complete sets of color samples illustrating the full range of finishes, textures, and colors available; 4 x 4 x 1 inches in size. Include samples of full range of mortar and sealant colors for all unit masonry work. Submit for Architect's initial selections.
 - 1. Masonry Unit Types requiring sample submittals include the following types:
 - a. Face Brick.
 - b. Decorative Concrete Masonry Units.
 - c. Polished Face Decorative Concrete Masonry Units.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit three samples for each selected finish, texture, and color; samples to be same product material type indicated for final Work; each masonry unit sample 12 x 12 x 1 inches; each mortar and sealant sample 3/8 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- E. Manufacturer's Certificate:
 - 1. Certify products meet or exceed specified requirements.
 - 2. Certify Aggregate used in Fire-Rated Concrete Masonry Units (CMU) is compliant with UL Fire Resistance Design Ratings requirements or alternate methods of determining fire resistance as allowed by Section 703.3 of the International Building Code.

1.6 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this Section with minimum five (5) years of documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this Section with minimum three (3) years documented experience.

1.7 MOCKUP

- A. Section 01 40 00 - Quality Requirements: Mockup requirements.
- B. Exterior Wall Mockup Construction: Construction is to include all wall assembly components from exterior to interior of building. Contractor is to coordinate the various trade contractors to provide their work types in a sequenced and timely manner.

1. Refer to Mockup details in Drawings.
2. Locate mockup construction as directed by Architect.
3. Mockup Construction Removal: Request and acquire approval from Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Inspect products for damage during deliveries on site.
- C. Store products in accordance with manufacturer's recommendation and to avoid damage.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Cold Weather Requirements: In accordance with TMS 402/602 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: In accordance with TMS 402/602 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with provisions of TMS 402/602, except when exceeded by requirements on Drawings or other Contract Documents.
 1. Maintain one copy of each document on project site.
- B. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated on Drawings.
 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.
 2. Provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E119 or UL 263, and as acceptable to authorities having jurisdiction.
 - a. Alternate methods for determining fire resistance are to be as allowed by Section 703.3 of the International Building Code.

2.2 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- C. Source Limitations for Masonry Accessories: Obtain each type of masonry accessory from single manufacturer for each product required.

2.3 MASONRY UNITS - GENERAL

- A. Special Shapes: Applies to all required masonry unit types.
 1. Provide special shape units for 90 degree and 135 degree corners and lintels.

2. Provide solid units where Drawings indicate unit setting position or special shape would otherwise result in exposure of unit cores, frogs, voids, or unfinished surfaces.
 3. Provide special shape units where Drawings indicate sculpted unit design (i.e. bullnose, angled, chamfered, ogee, coped water tables, sills, offsets, accents, etc.).
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. CMU Chips and Surface Deficiencies: In addition to the referenced standards regarding subject, also comply with the following more stringent requirements:
1. Do not install CMU with exposed chipped edges or corners greater than 1/2 inch and any exposed face damage or deviations greater than 1/4 inch diameter. All chips or deviations must be repaired to a surface consistent with the unblemished CMU surface and to the satisfaction of the Architect.

2.1 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and with exposed surfaces matching finish and color of exposed faces of adjacent units of same type.
1. Unit Size and Shape: Unless indicated otherwise on Drawings, modular face size to be 7-5/8 x 15-5/8 inches and depths as indicated on Drawings.
 - a. Bond: 1/2 Bond (Running Bond), unless indicated otherwise on Drawings.
 - b. Coursing: One unit and one mortar joint to equal 8 inches.
 - c. Mortar Joints Tooling: Refer to INSTALLATION in this Section.
 2. Provide special shape units configured for corners, lintels, headers, control joint edges and for special conditions indicated on Drawings.
 3. Provide bullnose units as follows:
 - a. Wall outside corners.
 - 1) Exception: Provide angle-corner units for first exposed course at outside corners scheduled to receive wall base finish. Grind exposed upper portion of angle-corner unit to create a smooth transition to match the bullnose units above.
 - b. Wall caps, unless other cap material finish is indicated.
 - c. Windowsills, unless other sill material finish is indicated.
- B. Fire-Rated Hollow Load Bearing and Non-Load Bearing Concrete Masonry Units (CMU):
1. ASTM C90; light weight; UL 618; ACI 216.1-14.
 2. Compressive Strength: As indicated on Drawings, but not less than 2,000 psi.
 3. Where indicated on Drawings, provide the following:
 - a. Vertical single scored face.
- C. Hollow Load Bearing Concrete Masonry Units (CMU):
1. ASTM C90; lightweight in accordance with ASTM C331 with the following modifications:
 - a. Organic Impurities (Color) - ASTM C40/C40M: Less than Organic Plate #1.
 - b. Clay Lumps (%) - ASTM C142/C142M: Less than 2%.
 - c. Stain Test (Index) - ASTM C641: No stain.
 2. Compressive Strength: As indicated on Drawings, but not less than 2,000 psi.
 3. Where indicated on Drawings, provide the following:
 - a. Vertical single scored face.
- D. Solid Load-Bearing Concrete Masonry Units (CMU):
1. ASTM C90; lightweight in accordance with ASTM C331 with the following modifications:
 - a. Organic Impurities (Color) - ASTM C40/C40M: Less than Organic Plate #1.

- b. Clay Lumps (%) - ASTM C142/C142M: Less than 2%.
 - c. Stain Test (Index) - ASTM C641: No stain.
 2. Compressive Strength: As indicated on Drawings, but not less than 2,000 psi.
 3. Where indicated on Drawings, provide the following:
 - a. Vertical single scored face.
- E. Hollow Non-Load Bearing Concrete Masonry Units (CMU):
 1. ASTM C129; lightweight.
 2. Compressive Strength: As indicated on Drawings, but not less than 2,000 psi.
 3. Where indicated on Drawings, provide the following:
 - a. Vertical single scored face.
- F. Concrete Brick Units: ASTM C55; for use in concealed from view utility applications.
 1. Compressive Strength: As indicated on Drawings, but not less than 2,000 psi.
 - a. If concrete brick units are used in an assembly with other concrete masonry units, match compressive strength of other concrete masonry units.
- G. Decorative Concrete Masonry Units:
 1. Basis of Design:
 - a. Oldcastle.
 2. ASTM C90; normal weight.
 3. Compressive Strength: Not less than 3,000 psi.
 4. Sizes and Shapes: As indicated on the Drawings.
 5. Bond: 1/2 Bond, unless indicated otherwise on Drawings.
 6. Coursing: One unit and one mortar joint to equal 8 inches.
 7. Mortar Joints Tooling: Refer to INSTALLATION in this Section.
 8. Finish: All surfaces exposed-to-view are to be uniform in color and appearance. Damaged or chipped corners or faces are unacceptable.
 9. Where indicated on Drawings, provide the following:
 - a. Vertical single scored face.
 10. Unit Color:
 - a. As selected by Architect from manufacturer's full range.
 11. Mortar Color: Colored mortar for each masonry unit color indicated.
 - a. As selected by Architect from manufacturer's full range.
 - b.
- H. Polished Face Decorative Concrete Masonry Units: Manufactured with prefinished polished face on all exposed-to-view surfaces.
 1. Basis of Design:
 - a. Oldcastle.
 2. ASTM C90; normal weight.
 3. Compressive Strength: Not less than 3,000 psi.
 4. Sizes and Shapes: As indicated on Drawings.
 5. Bond: 1/2 Bond, unless indicated otherwise on Drawings.
 6. Coursing: One unit and one mortar joint to equal 8 inches.
 7. Mortar Joints Tooling: Refer to INSTALLATION in this Section.
 8. Finish: All surfaces exposed-to-view are to be uniform in color and appearance. Damaged or chipped corners or faces are unacceptable.
 9. Where indicated on Drawings, provide the following:
 - a. Vertical single scored face.
 10. Unit Color:
 - a. As selected by Architect from manufacturer's full range.
 11. Mortar Color: Colored mortar for each masonry unit color indicated.
 - a. As selected by Architect from manufacturer's full range.
- I. Cast Stone Masonry: Refer to Section 04 72 00 - Cast Stone Masonry.

2.2 BRICK MASONRY UNITS

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units of same type:
1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
 5. For Soldier Course applications, provide shapes that produce coursing pattern and unit size as indicated on Drawings.
- B. Face Brick Modular Size: ASTM C216, Type FBS, Grade SW.
1. Size: 2-1/4 x 3-5/8 x 7-5/8 inches.
 2. Unit Compressive Strength: 3,000 psi minimum, unless indicated otherwise on Drawings.
 - a. Measured in accordance with ASTM C67/C67M.
 - b. As determined by average of five (5) brick method; and no individual brick less than 2,500 psi.
 3. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C67/C67M.
 4. Efflorescence Rating: Rating to be "not effloresced" in accordance with ASTM C67/C67M or rating to be "slightly effloresced" in accordance with CSA A82.
 5. Bond: 1/2 Bond (Running Bond); unless indicated otherwise on Drawings.
 6. Coursing: Three units and three mortar joints to equal 8 inches.
 7. Mortar Joint Tooling: Refer to INSTALLATION in this Section.
 8. Basis of Design: Subject to compliance with requirements, provide face brick with physical and visual characteristics comparable to the following Basis of Design units, and as approved by Architect:
 - a. Face Brick - BRK1.
 - 1) Basis of Design and Color:
 - a) Palmetto: Medium Red Wirecut.
 - b. Face Brick Color - BRK2.
 - 1) Basis of Design and Color:
 - a) Palmetto: 0.25 Greystone Wirecut.
 - c. Face Brick Color - BRK3.
 - 1) Basis of Design and Color:
 - a) Palmetto: Whitestone Wirecut.
- C. Building (Common) Brick: ASTM C62, Grade SW; solid units; for use in concealed from view utility applications.
1. Compressive Strength: 3,000 psi minimum, unless indicated otherwise on Drawings.
 - a. Measured in accordance with ASTM C67/C67M.
 - b. As determined by average of five (5) brick method; and no individual brick less than 2,500 psi.
 2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C67/C67M.
 3. Efflorescence Rating: Rating to be "not effloresced" in accordance with ASTM C67/C67M or rating to be "slightly effloresced" in accordance with CSA A82.

2.3 ACCESSORIES

- A. Manufacturers: Reinforcement and anchorage materials.
 - 1. Hohmann & Barnard, Inc.
 - 2. Wire-Bond.
 - 3. Blok-Lok Limited.
- B. Mortar and Grout: As specified in Section 04 05 03 - Masonry Mortaring and Grouting.
- C. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength, deformed billet bars, uncoated finish.
- D. Reinforcing Steel Rebar Positioners (Z-shaped wire bridges cell of block while bent ends rest on block shell):
 - 1. Basis of Design: Hohmann & Barnard, Inc - HB RB Rebar Positioner.
 - 2. Wire (Carbon Steel): Cold-drawn steel wire conforming to ASTM A1064/A1064M.
 - 3. Wire Diameter: 9 gauge (.148 inch).
 - 4. Tensile Strength: 80,000 psi.
 - 5. Yield Point - 70,000 psi minimum.
 - 6. Hot-Dip Galvanized after fabrication: ASTM A153/A153M (1.5 oz/ft).
- E. Single Wythe Joint Reinforcement: Ladder type; ASTM A951/A951M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; 0.1875 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.
 - 1. Basis of Design: Hohmann & Barnard, Inc - HB 220 Ladder-Mesh.
- F. Multiple Wythe Joint Reinforcement: Ladder type; ASTM A951/A951M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; 0.1875 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.
 - 1. Basis of Design: Hohmann & Barnard, Inc - HB 220 Ladder-Mesh.
- G. Strap Anchors: Zee bent steel shape. 1-1/2 x 16 inches size x 1/4 inch thick. Hot dip galvanized after fabrication to ASTM A153/A153, Class B.
 - 1. Basis of Design: Hohmann & Barnard, Inc - HB 344 Rigid Partition Anchor.
- H. Cavity Wall Joint Reinforcing / Wall Ties: Ladder type, 0.1875 inch side rods with 0.148 inch cross rods; eye and pintle type anchors, 0.188 inch wire with compressed pintle legs; seismic clip to continuous rod in veneer, 0.1875 inch rod. All, ASTM A951/A951M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B.
 - 1. Basis of Design: Hohmann & Barnard, Inc. - HB 265 S.I.S Ladder -2X Hook Anchor and Seismic Interlock System.
 - 2. Where coursing of masonry veneer and structural masonry is not dimensionally aligned, provide joint reinforcing and wall tie system that allows for variations in alignment, up to 2-1/4 inch.
 - 3. Soldier Course Masonry Veneer: Due to the vertical joint condition, anchor system must turn vertical to accommodate joint.
 - a. Base Plate: ASTM A1008/A1008M carbon steel plate, 16 gauge thick x 2 inches wide with 1 inch bend. Hot dip galvanized to ASTM A153/A153M, Class B.
 - b. Wire Tie: ASTM A1064/A1064M carbon steel, 0.1875 inch wire. Hot dip galvanized to ASTM A153/A153M, Class B.
 - c. Basis of Design: Hohmann & Barnard, Inc. - HB BL-5407.
- I. Wall Ties: ASTM A1064/A1064M; steel wire 0.1875 inch diameter, eye and pintle type. ASTM A153/A153M, Class B hot dip galvanized after fabrication.

- J. Wall Ties (For Attachment to Metal Stud): Two-piece type; ASTM A1008/A1008M, 14 gage steel anchors; 0.1875 inch diameter wire ties. ASTM A153/A153M, Class B hot dip galvanized after fabrication.
- K. Wall Ties (For Attachment to Structural Steel): Two-piece type; 0.25 inch continuous steel weld-on anchors, 8 feet total length, with 3/8 inch offsets spaced 8 inches OC.; 0.1875 inch diameter wire ties. ASTM A153/A153M, Class B hot dip galvanized after fabrication.
- L. Wall Ties (For Attachment to Concrete Walls): Two piece type; ASTM A1008/A1008M, 18 gauge steel imbedded dovetail anchors, 10 feet total length, with foam insert; 0.1875 inch diameter wire ties. ASTM A153/A153M, Class B hot dip galvanized after fabrication.
- M. Through-Wall Flashing and Counter Flashing: Self adhering stainless steel fabric flashing; width of roll to suit application; with preformed end dams, and inside and outside corners.
1. Thickness:
 - a. Membrane - 0.040 inch (40 mil).
 - b. Stainless steel - 0.003 inch (3 mil); Type 304.
 2. Tensile Strength - ASTM D412C: 100.000 psi, minimum.
 3. Puncture Resistance - ASTM E154: 2,500 psi, minimum.
 4. Peel Strength of Adhesive Bonds - ASTM D903: Not less than 103 lbs/ft.
 5. Fire Resistance - ASTM E84: Pass.
 6. Mold Resistance - ASTM D3273: Pass.
 7. Basis of Design: Hohmann & Barnard, Inc. - Mighty-Flash, SA Flashing.
- N. Termination Bar at Top of Through-Wall Flashing: Type 304, stainless steel type, 1 inch x 8 feet x 1/8 inch thick.
1. At all locations where top edge of through-wall flashing is not indicated to be imbedded into back-up masonry wall, install continuous Termination Bar along top edge using stainless steel fasteners at 8 inches OC., preventing pull-out. Apply sealant continuously along top edge of termination bar and flashing assembly to seal against water penetration behind top of through-wall flashing assembly.
 2. Basis of Design: Hohmann & Barnard, Inc.
- O. Metal Flashing Drip Edge Plate: Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gauge (0.0179 inch) thick, factory formed hemmed drip edge configuration; finish 2D (dull).
1. Basis of Design: Hohmann & Barnard, Inc. - HB Drip Edge Plate.
 2. Length: Not less than 8 feet long.
 3. Width: As indicated on Drawings, but not less than 3 inches wide.
 4. Provide factory preformed Inside Corners, Outside Corners and End Dams.
- P. Preformed Control and Expansion Joints: Extruded polyvinyl chloride material conforming with ASTM D2287. Furnish with corner and tee accessories. Fuse joints.
1. Tensile Strength - ASTM D412: 2200 psi.
 2. Ultimate Elongation - ASTM D412: 350 percent.
 3. Shore A Hardness - ASTM D2240: 85 (+ or - 5).
 4. Low Temp Brittleness - ASTM D746: -35 degrees C.
- Q. Joint Filler: Closed cell rubber (polychloroprene) oversized 50 percent to joint width; self-expanding; width indicated by maximum lengths.
- R. Cavity Drainage Material:
1. Open polyethylene or polypropylene mesh; thickness as required to fill cavity space; 10 inches high with 7 inches deep dovetail notches at top; designed to allow cavity drainage and prevent collection and damming effect of mortar droppings in cavity.
- S. Weeps: Preformed corrugated polypropylene cell vents; conforming to ASTM D2240, ASTM D790B, ASTM D638, and ASTM D1238B standards.

1. Basis of Design: Hohmann & Barnard, Inc. - HB Quadro Vent.
 2. Size: 2-1/2 x 3-1/2 inches size, 3/8 inch thick.
 3. Color: Clear.
- T. Cavity Vents: Same material as weeps.
- U. Masonry Cleaning Solution: Non-acidic and not harmful to masonry or adjacent materials.
1. Manufacturers:
 - a. EaCo Chem., Inc. - NMD 80 New Masonry Detergent.
 - b. PROSOCO - Sure Klean Vana Trol.
 2. Basis of Design: PROSOCO - Sure Klean Vana Trol.
- V. Steel Lintels, Windowsill Supports, and Other Steel Supports: Refer to Section 05 50 00 - Metal Fabrications. Size and configuration as indicated on Drawings. All exterior steel components to be hot dip galvanized per Section 05 50 00.
- W. Parging Material: Light weight mortar finish coat.
1. Basis of Design: Sika Corporation - SikaQuick Smooth Finish.
 2. One component; polymer modified mortar; compressive strength of 2,000 psi, minimum at 28 days; tension adhesive strength of 250 psi, minimum at 28 days.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify field conditions are acceptable and are ready to receive work.
- C. Verify items provided by other Sections of work are properly sized and located.
- D. Verify built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Direct and coordinate placement of metal anchors supplied to other Sections.
- D. Provide protection coverings to protect adjacent and surrounding work from damage and mortar and grouting splatters/droppings.
- E. Furnish temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent support.
- F. Wet clay and shale brick before laying when initial rate of absorption is greater than 30 grams when tested in accordance with ASTM C67/C67M.

3.3 INSTALLATION

- A. Protection Against Water Infiltration: Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.
- B. Establish lines, levels, and coursing indicated. Protect from displacement.
- C. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.

- D. Placing and Bonding:
1. Lay solid masonry units in full bed of mortar, with full head joints.
 2. Lay hollow masonry units with face shell bedding on head and bed joints.
 3. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
 4. Remove excess mortar as work progresses.
 5. Interlock intersections and external corners.
 6. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar, and replace.
 7. Perform job site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
 8. Isolate masonry from vertical structural framing members with movement joint.
 9. Isolate top of masonry from horizontal structural framing members and slabs or decks with compressible joint filler.
- E. Mortar Joints Finishing:
1. General:
 - a. Mortar joints to be of consistent execution with consistent depth and width. Strike vertical joints first, then strike horizontal joints. This provides a continuous horizontal joint (uninterrupted by vertical joints) and is the required appearance.
 - b. Mortar joints at bullnose corners are to be continuously tooled around corner and to be consistent in appearance with the straight-run joints.
 - c. Clean inside corner joints free of excess mortar and finish.
 2. Concave Tooling: Use convex steel tool of diameter 1/4 inch greater than joint width.
 - a. Application: All locations unless indicated otherwise in this Section or on Drawings.
 - b. Diameter Exception: For walls not indicated to receive parging or plaster in the following areas, use convex tool of 2 inch diameter (such as PVC pipe) for tooling masonry wall joints. The intent is to comply with common local Health Department requirements by minimizing the tooled joint depth.:
 - 1) Kitchen Areas.
 - 2) Food Serving Areas.
 - 3) Dishwashing Areas.
 - 4) Food Storage Areas.
 - 5) Kitchen Office Areas.
 - 6) Kitchen Toilet and Locker Areas.
 - 7) Dining Areas.
 3. Flush-Cut Joints: Cut mortar joints flush with face of masonry units; no tooling.
 - a. Applications:
 - 1) Masonry walls indicated to receive parged wall surface coat.
 - 2) Masonry walls indicated to receive direct applied plaster finish, dampproofing, or waterproofing materials.
 - 3) Behind resilient base locations, cut mortar joints flush with face of masonry units and only where concealed behind the resilient base application. Coordinate with approved resilient base height.
 4. Where masonry wall is constructed of vertically scored CMU, joint tooling to be recessed to same depth as CMU manufactured score.
- F. Weeps: Furnish weeps in outer wythe at 24 inches OC. horizontally above through-wall flashing, above shelf angles and lintels and at bottom of walls.
- G. Cavity Wall: Do not permit mortar to drop or accumulate into cavity air space or to plug weeps.
1. Install cavity drain material continuously at bottom of each cavity above through-wall flashing.

2. At foundation and below grade locations, don't allow debris or soil to collect and remain in the cavity prior to installing the cavity materials as indicated on Drawings. Ensure that the cavity is free of any debris or soil prior to installing cavity materials as indicated on Drawings.
- H. Joint Reinforcement and Anchorage - Single Wythe Masonry:
1. Install horizontal joint reinforcement 16 inches OC.
 2. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 3. Place joint reinforcement continuous in first joint below top of walls.
 4. Lap joint reinforcement ends minimum 6 inches.
 5. Reinforce joint corners and intersections with strap anchors 16 inches OC.
- I. Joint Reinforcement and Anchorage - Multiple Wythe Unit Masonry:
1. Install horizontal joint reinforcement 16 inches OC.
 2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 3. Place joint reinforcement continuous in first and second joint below top of walls.
 4. Lap joint reinforcement ends minimum 6 inches.
 5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- J. Joint Reinforcement and Anchorage - Masonry Veneer (where no cavity indicated on Drawings) (Interior walls only; exterior walls must have cavity for drainage):
1. Install horizontal joint reinforcement 16 inches OC.
 2. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 3. Place joint reinforcement continuous in first joint below top of walls.
 4. Lap joint reinforcement ends minimum 6 inches.
 5. Embed wall ties in masonry backing to bond veneer at maximum 16 inches OC vertically and 16 inches OC horizontally. Place wall ties at maximum 8 inches OC vertically within 8 inches of jamb of wall openings.
 6. Reinforce joint corners and intersections with strap anchors 16 inches OC.
- K. Joint Reinforcement and Anchorages - Cavity Wall Masonry:
1. Install horizontal joint reinforcement 16 inches OC.
 2. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 3. Place joint reinforcement continuous in first joint below top of walls.
 4. Lap joint reinforcement ends minimum 6 inches.
 5. Attach to structural steel members. Embed anchorages in every second block joint.
 6. Reinforce joint corners and intersections with strap anchors 16 inches OC.
- L. Masonry Through-Wall Flashings:
1. Solid substrate to be continuous below and behind flashing material.
 2. Install metal flashing drip edge plate with sealed lap joints and preformed corners and end dams in accordance with manufactures recommendations. Adhere through-wall flashing continuously along top of drip edge plate as indicated on Drawings and with adhesive compatible with both surface types.
 3. Whether or not specifically indicated, install masonry through-wall flashing to divert water to exterior at all locations where downward flow of water would otherwise be interrupted.
 4. Extend through-wall flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, under parapet caps and at bottom of walls, and terminate bottom and top edges as indicated on Drawings.

- a. Unless indicated otherwise on Drawings, extend vertical flashing portion a minimum of 8 inches above lower flashing portion that diverts water to exterior.
 - 1) Self-Adhering Flashing (when indicated):
 - a) Terminate top edge with continuous termination bar and sealant.
 - b) Terminate bottom edge at no more than 1/4 inch from exterior face of masonry. For steel support lintels and ledges, terminate bottom edge of flashing at steel support edge.
 - 2) Non-Self-Adhering Flashing (when indicated):
 - a) Terminate top edge by embedding top edge into masonry joint with a minimum of 1-1/2 inches embedment and seal.
 - (1) Exception: Only if indicated on Drawings in specific construction locations, top edge to be terminated with termination bar and sealant.
 - b) Terminate bottom edge at no more than 1/4 inch from exterior face of masonry. For steel support lintels and ledges, terminate bottom edge at steel support edge.
 5. Lap end joints minimum 6 inches and seal watertight with sealant recommended by flashing manufacturer.
 6. Form and configure flashing as to drain moisture along its drainage path to the exterior of the wall, preventing moisture migration into the wall and cavity.
 7. Turn flashing, fold, and seal at corners, bends, and interruptions. Use preformed end dams, and inside and outside corners when indicated.
- M. Lintels:
1. Install loose steel and reinforced unit masonry lintels over openings as indicated.
 2. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled or indicated.
 3. Do not splice reinforcing bars.
 4. Support and secure reinforcing bars from displacement.
 5. Place and consolidate grout fill without displacing reinforcing.
 6. Allow masonry lintels to attain specified strength before removing temporary supports.
 7. Maintain minimum 8 inches bearing on each side of opening.
- N. Grouted Components:
1. Reinforce bond beam as indicated on Drawings.
 2. Lap splices for reinforcing bars to be as required by code and Drawings and as related to the bar diameters.
 3. Support and secure reinforcing bars from displacement.
 4. Place and consolidate grout fill without displacing reinforcing.
 5. At bearing locations, fill masonry cores with grout for minimum 12 inches both sides of opening.
- O. Reinforced Masonry:
1. Lay masonry units with core vertically aligned and clear of mortar and unobstructed.
 2. Place reinforcement bars as indicated on Drawings.
 3. Splice reinforcement in accordance with Section 03 20 00.
 4. Support and secure reinforcement from displacement.
 5. Place and consolidate grout fill without displacing reinforcing.
 6. Place grout in accordance with TMS 402/602 Specification for Masonry Structures.
- P. Control and Expansion Joints:
1. Install control and expansion joints at locations indicated on Drawings and not to exceed the following maximum spacing:

- a. Exterior Walls: 24 feet on center and within 24 inches on one side of each interior and exterior corner.
 - b. Interior Walls: 24 feet on center.
 - c. At changes in wall height.
2. Do not continue horizontal joint reinforcement through expansion joints.
 3. Install preformed control and expansion joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
 4. Size control joint in accordance with Section 07 90 00 for sealant performance.
 5. Form expansion joint by omitting mortar and cutting unit to form open space.
- Q. Built-In Work:
1. As work progresses, install built-in metal door and glazed frames, window frames, anchor bolts, plates, and other items to be built-in the work and furnished by other Sections.
 2. Install built-in items plumb and level.
 3. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
 4. Do not build into masonry construction organic materials or other materials that are subject to deterioration.

3.4 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, and other construction requirements indicated. Coordinate with other Sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.
- C. Core drill masonry walls for pipe and sleeve penetrations, regardless of size. Do not break out masonry for penetration access.
- D. All ductwork and large sleeve penetrations wider than 16 inches must have at least 4 inches solid masonry on both sides, supporting steel lintel or bond beam over opening.

3.5 PARGING - WALL SURFACE COAT

- A. Application:
 1. Kitchen Areas.
 2. Food Serving Areas.
 3. Dishwashing Areas.
 4. Food Storage Areas.
 5. Kitchen Office Areas.
 6. Kitchen Toilet and Locker Areas.
 7. Dining Areas.
- B. Prepare material and apply in accordance with manufacturer's instructions and as follows:
 1. Dampen masonry walls prior to parging. Substrate should be Saturated Surface Dry (SSD).
 2. Parge masonry walls with number of coats recommended by manufacturer to achieve the total dry thickness. Scarify preceding coat to ensure bond to subsequent coat.
 3. Total Dry Thickness: Minimum indicated; additional thickness as required to produce a uniformly flat and smooth wall surface.
 - a. 1/8 inch thick.
 4. Steel trowel surface smooth and flat with a maximum surface variation of 1/16 inch in 4 feet.

5. Where edge of parging is exposed, parging edge is to be straight and beveled smooth to 45 degrees angle back to substrate.
6. Sand surface as needed. Finish as required for paint or other scheduled finish.

3.6 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Alignment of Columns and Pilasters: 1/4 inch.
- C. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.
- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- G. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.
- I. Maximum Variation for Steel Reinforcement:
 1. Install reinforcement within the tolerances specified in TMS 402/602 for foundation walls.
 2. Plus or minus 1/2 inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
 3. Plus or minus 1 inch when distance is between 8 and 24 inches.
 4. Plus or minus 1-1/4 inch when distance is greater than 24 inches.
 5. Plus or minus 2 inches from location along face of wall.

3.7 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Replace defective mortar. Match adjacent work.
- D. After mortar is thoroughly set and cured, clean masonry in accordance with manufacturer's recommendations and as follows:
 1. Remove large mortar particles with wooden paddles & non-metallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 4. In accordance with BIA Technical Note 20, use bucket and brush hand cleaning method to clean brick masonry made from clay or shale, except use detergent as masonry cleaner.
 5. Do not use high pressure washer to clean masonry. Low pressure washer, less than 50 psi, or water hose may be used to clean masonry.
 6. Protect adjacent exterior components to include, but not limited to, wall louvers, exterior lights, door and window frames from damage and corrosion from non-approved cleaners.

- E. Progress Payments for completed work will not be made until brick is cleaned of all excessive mortar and mortar stains.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
- C. Protect masonry and other items built into masonry walls from spatter, droppings, and staining that can be caused by other work activities such as mortaring and grouting.
 - 1. Aggressive protection efforts to be provided for interior and exterior base of walls and windowsills.
- D. Protection Against Water Infiltration: Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

END OF SECTION

SECTION 04 72 00
CAST STONE MASONRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sills for windows.
 - 2. Caps for masonry walls.
 - 3. Caps for masonry columns.
 - 4. Caps for monumental sign wall.
 - 5. Other cast stone items indicated on Drawings.

- B. Related Requirements:
 - 1. Section 04 05 03 - Masonry Mortaring and Grouting: Mortar for setting cast stone.
 - 2. Section 04 20 00 - Unit Masonry: Installation of cast stone in conjunction with masonry.
 - 3.
 - 4. Section 05 50 00 - Metal Fabrications: Loose lintels and supports for cast stone units.
 - 5. Section 07 90 00 - Joint Protection: Sealing joints indicated to be left open for sealant.

1.2 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 318 - Building Code Requirements for Structural Concrete (ACI 318-19) Commentary on Building Code Requirements for Structural Concrete (ACI 318R-19); 2019, Errata 2022.

- B. American National Standards Institute (ANSI):
 - 1. ANSI B101.3 - Test Method for Measuring Wet DCOF of Common Hard-Surface Floor Materials; 2020.

- C. ASTM International (ASTM):
 - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
 - 2. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2022.
 - 3. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2019.
 - 4. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2022.
 - 5. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2019, with editorial change 2020.
 - 6. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
 - 7. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2023.
 - 8. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2023.
 - 9. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
 - 10. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.

11. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019, with Editorial Revision 2022.
 12. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2021.
 13. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
 14. ASTM C1195 - Standard Test Method for Absorption of Architectural Cast Stone; 2021.
 15. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2023.
- D. The Masonry Society (TMS):
1. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate cast stone work with masonry backup and veneer, framed backup, and installation of anchors for frames in openings.

1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures: Requirements, for submittal procedures.
- B. Product Data: Test results of cast stone components made previously by the manufacturer.
- C. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- D. Samples for Initial Selections: Two manufacturer's complete sets of color samples illustrating the full range of finishes, textures, and colors available; 4 x 4 x 1 inches in size. Include samples of full range of mortar and sealant colors. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, texture, and color; samples to be same product material type indicated for final Work; each cast stone sample 12 x 12 x 1 inches; each mortar and sealant sample 3/8 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Test Reports: Indicate concrete mix design compressive strength and water absorption.
- G. Manufacturer's Installation Instructions: Submit instructions for anchor attachment, cast stone cleaning, and special Project installation conditions.
- H. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with TMS 402/602 Building Code Requirements and Specifications for Masonry Structures.
- B. Perform Work in accordance with Cast Stone Institute Technical Manual.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.

1. Current producer member of the Cast Stone Institute or the Architectural Precast Association.
 2. Manufacturer's production facility currently holds a Plant Certification from the Cast Stone Institute or the Architectural Precast Association.
 3. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience.

1.7 MOCKUP

- A. Section 01 40 00 - Quality Requirements: Mockup requirements.
- B. Provide full size cast stone components for installation in mock-up of exterior wall.
1. Approved mockup will become standard for appearance and workmanship.
 2. Remove mock-up not incorporated into the work and dispose of debris.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- C. Number each piece individually to match shop drawings and schedule.
- D. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- E. Store cast stone components on pallets with non-staining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- F. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- G. Store mortar materials where contamination will not occur.
- H. 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.
- I. Cast stone units are not to be packaged and shipped prior to completion of curing, and prior to drying from cleaning of cement film process.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Cold Weather Requirements: In accordance with TMS 402/602 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: In accordance with TMS 402/602 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Architectural Cast Stone:
 - 1. Any current producer member of the Architectural Precast Association or the Cast Stone Institute.

2.2 ARCHITECTURAL CAST STONE

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364.
 - 1. Compressive Strength: ASTM C39/C39M; minimum 5,000 psi at 28 days.
 - 2. Absorption: ASTM C1195; maximum 6 percent for cold water and 10 percent for boiling water at 28 days.
 - 3. Freeze-Thaw Resistance: Demonstrated by field experience.
 - 4. Surface Texture: Fine grained texture, with no bug holes, air voids, or other surface blemishes visible from distance of 10 feet.
 - 5. Remove cement film from exposed surfaces before packaging for shipment.
 - 6. Color:
 - a. To be selected by Architect from manufacturer's full range.
- 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 and as indicated on Drawings.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
 - 1. Pieces more than 24 inches in any dimension: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.
- D. Materials:
 - 1. Portland Cement: ASTM C150/C150M.
 - a. For Precast Units:
 - 1) Type I - Normal, white or gray as required to match Architect 's selected sample.
 - 2) Type III - High Early Strength, for use in cold weather, white or gray as required to match Architect 's selected sample.
 - b. For Units: Type I or II, white.
 - 2. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
 - 3. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
 - 4. Pigments: ASTM C979, inorganic iron oxides; do not use carbon black.
 - 5. Admixtures: ASTM C494/C494M.
 - 6. Water: Potable.
 - 7. Reinforcing Bars: ASTM A615/A615M deformed bars, galvanized.
 - a. Galvanized in accordance with ASTM A767/A767M, Class I.
 - b. Epoxy coated in accordance with ASTM A775/A775M.

8. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.
9. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
10. Flashings: As specified in Section 04 20 00 and as indicated on Drawings.
11. Shelf Angles and Similar Structural Items: Hot-dip galvanized steel per ASTM A123/A123M, of shapes and sizes as required for conditions.
12. Mortar: Portland cement-lime, as specified in Section 04 05 11; do not use masonry cement.
13. Mortar: As specified in Section 04 20 00.
14. 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.

2.3 FABRICATION

- A. Size: As indicated on Drawings, square edges unless indicated otherwise on Drawings.
- B. Use rigid molds, constructed to maintain cast stone units uniform in shape, size, and finish.
- C. Form units to length required for joint layout indicated on Drawings. Field cutting to length is not permitted.
- D. Reinforce units in accordance with ASTM C1364 for safe handling and as indicated on shop drawings to resist structural loads.
- E. Form corners to profiles indicated on Drawings.
- F. Form drip slot in bottom surface of exterior units projecting 3/4 inch or more beyond face of wall. Locate slot 3/8 inch back from nose of projection. Size slot not less than 3/8 inch wide and 3/8 inch deep and continuous for full width of projection.
- G. Curing: Cure units to develop concrete quality, and to minimize appearance blemishes including non-uniformity, staining, or surface cracking.
- H. Clean exposed-to-view surfaces to remove cement film and achieve uniform appearance.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine construction to receive cast stone components.
- C. Do not begin installation until unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.

- B. Provide for erection procedures and induced loads during erection. Furnish temporary bracing during installation. Maintain temporary bracing in place until final support is provided.
- C. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 20 00.
- D. Mechanically anchor cast stone units indicated; set remainder in mortar.
- E. Erect units without damage to shape or finish. Replace or repair damaged panels.
- F. Erect units level and plumb within allowable tolerances.
- G. Align and maintain uniform horizontal and vertical joints as erection progresses.
- H. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.
- I. 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. Allow for final joint finish material application.
 - 3. Fill vertical joints with mortar but allowing for final joint finish material application.
 - 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.
- J. Joints: Where Drawings indicate specific locations for joints, comply with locations indicated.
 - 1. Exposed joint widths to be 3/8 inch unless otherwise indicated on Drawings.
 - 2. Rake and clear mortar joints to 3/4 inch depth from unit face for application of joint finish material.
 - 3. Remove excess mortar from face of stone before application of joint finish material.
 - 4. Seal perimeter and intermediate joints in accordance with Section 07 90 00 with non-staining, silicone type sealant.
 - 5. Tool joint finish material to finish profile as indicated on Drawings.
- K. Repairs and Replacement of Damaged Units:
 - 1. Repair chips and other surface damage noticeable when viewed in direct daylight at 10 feet.
 - 2. Repair with matching repair materials provided by the manufacturer and in accordance with manufacturer's instructions.
 - 3. Architect's judgement regarding acceptability of repair results is final.
 - 4. Remove and replace units that are not repaired to the approval of Architect.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
- C. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
- D. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.

- E. 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.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean Work in accordance with manufacturer's instructions.
- C. Keep cast stone components clean as work progresses.
- D. Clean completed exposed cast stone after mortar is thoroughly set and cured.
- E. Wet surfaces with water before applying cleaner.
- F. Apply cleaner to cast stone in accordance with manufacturer's instructions.
- G. Remove cleaner promptly by rinsing thoroughly with clear water.
- H. Do not use acidic cleaners.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect completed work from damage.
- C. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Structural shapes.
 2. Channels and angles.
 3. Hollow structural sections.
 4. Structural pipe.
 5. Structural plates and bars.
 6. Fasteners, connectors, and anchors.
 7. Base plate grout.
- B. Related Sections:
1. Section 052100 - Steel Joists.
 2. Section 053100 - Steel Decking.

1.2 REFERENCES

- A. American Institute of Steel Construction:
1. AISC Code of Standard Practice for Steel Buildings and Bridges.
 2. AISC Load and Resistance Factor Design (LRFD) Specification for Structural Steel Buildings.
 3. AISC Load and Resistance Factor Design Specification for Single-Angle Members.
 4. AISC Seismic Provisions for Structural Steel Buildings.
 5. AISC Specification for Allowable Stress Design of Single-Angle Members.
 6. AISC Specification for the Design of Steel Hollow Structural Sections.
 7. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.
- B. American Society of Civil Engineers:
1. ASCE 19 - Standard Applications of Steel Cables for Buildings.
- C. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
 4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 5. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 6. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
 7. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 8. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 9. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.

10. ASTM A449 - Standard Specification for Quenched and Tempered Steel Bolts and Studs.
 11. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
 12. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 13. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 14. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
 15. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
 16. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 17. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 18. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4-in. (100-mm) Thick.
 19. ASTM A618 - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.
 20. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
 21. ASTM A847 - Standard Specification for Cold-Formed Welded and Seamless High Strength, Low Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance.
 22. ASTM A852/A852M - Standard Specification for Quenched and Tempered Low-Alloy Structural Steel Plate with 70 ksi (485 MPa) Minimum Yield Strength to 4 in. (100 mm) Thick.
 23. ASTM A913/A913M - Standard Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST).
 24. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
 25. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 26. ASTM E94 - Standard Guide for Radiographic Examination.
 27. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.
 28. ASTM E165 - Standard Test Method for Liquid Penetrant Examination.
 29. ASTM E709 - Standard Guide for Magnetic Particle Examination.
 30. ASTM F436 - Standard Specification for Hardened Steel Washers.
 31. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
 32. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
 33. ASTM F1852 - Standard Specification for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- D. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 2. AWS D1.1 - Structural Welding Code - Steel.
- E. National Association of Architectural Metal Manufacturers:

1. NAAMM MBG 531, "Metal Bar Grating Manual"
- F. Research Council on Structural Connections:
 1. RCSC - Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- G. SSPC: The Society for Protective Coatings:
 1. SSPC - Steel Structures Painting Manual.
 2. SSPC Paint 15 - Steel Joist Shop Paint.
 3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
 4. SSPC SP 3 - Power Tool Cleaning.
 5. SSPC SP 6 - Commercial Blast Cleaning.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 1. Indicate profiles, sizes, spacing, location of structural members, openings, attachments and fasteners.
 2. Connections. Engage a fabricator who utilizes a North Carolina registered Professional Engineer to prepare calculations, shop drawings and other structural data for structural steel connections.
 3. Cambers.
 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.
- D. Manufacturer's Mill Certificate: Certify products meet or exceed specified requirements.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 1. AISC Code of Standard Practice for Steel Buildings and Bridges.
 2. AISC Code of Standard Practice for Steel Buildings and Bridges. Section 10.
 3. AISC Seismic Provisions for Structural Steel Buildings.
 4. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.

1.5 QUALIFICATIONS

- A. Fabricator: Company specializing in performing Work of this section with minimum 5 years' experience with the following current AISC Certification:
 1. Certified Building Fabricator (BU).
 2. In lieu of AISC Certification, fabricator approval shall be obtained based upon review of fabrication and quality control procedures and periodic inspection of fabrication practices by an approved third party agency.
- B. Erector: Company specializing in performing Work of this section with minimum 5 years' experience.
- C. Welders and Welding Procedures: AWS D1.1 qualified within previous 12 months.

1.6 COORDINATION

- A. Section 014000 - Quality Requirements.
- B. Coordinate work with the following:
 - 1. Section 052100, 053100.
 - 2. Section 055000 for miscellaneous steel supports other than structural steel.
 - 3. Section 078110 for finishes on structural steel receiving fireproofing.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

- A. Structural W-Shapes: ASTM A992.
- B. Structural M-Shapes: ASTM A36.
- C. Structural T-Shapes: Cut from structural W-shapes.
- D. Channels and Angles: ASTM A36.
- E. Square and Rectangular Hollow Structural Sections: ASTM A500, Grade B.
- F. Structural Pipe: ASTM A53, Grade B.
- G. Structural Plates and Bars: ASTM A36.
- H. Wire Rod for Grating Crossbars: ASTM A 510

2.2 FASTENERS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.
 - 1. Finish, Interior Framing: Plain, uncoated.
 - 2. Finish, Exterior Framing: Mechanically deposited zinc coating, ASTM B 695, Class 50.
- B. Nuts: ASTM A563 heavy hex type.
 - 1. Finish: Unfinished.
- C. Washers: ASTM F436; Type 1, circular
 - 1. Finish: Unfinished.
- D. Shear Connectors: ASTM A108; Grade 1015 or 1020, headed, unfinished and in accordance with AWS D1.1; Type B.
- E. Threaded Anchor Rods: ASTM F 1554, Grade 36 or Grade 55, as indicated on Drawings.
 - 1. Configuration: Straight.
 - 2. Nuts: ASTM A 563 (ASTM A 563M) heavy hex carbon steel.
 - 3. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 4. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
 - 5. Finish, Interior Framing: Plain.
 - 6. Finish, Exterior Framing: Hot-dip zinc coating, ASTM A 153/A 153M, Class C or mechanically deposited zinc coating, ASTM B 695, Class 50.

2.3 WELDING MATERIALS

- A. Welding Materials: AWS D1.1; type required for materials being welded.

2.4 ACCESSORIES

- A. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing minimum compressive strength of 7,000 psi at 28 days.
- B. Shop and Touch-Up Primer:
 - 1. Concealed Structural Steel: Fabricators dark color rust-inhibiting primer.
 - 2. Exposed Structural Steel: Refer to Division 9.

2.5 FABRICATION

- A. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- B. Fabricate connections for bolt, nut, and washer connectors.
- C. Develop required camber for members.

2.6 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP 3 "Power Tool Cleaning" for all concealed work and SSPC SP 6 "Commercial Blast Cleaning" for all work exposed to view.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded or in contact with concrete.
- C. Galvanizing for Structural Steel Members: ASTM A123; minimum 1.2 oz/sq ft coating thickness; galvanize after fabrication.
- D. Galvanizing for Fasteners, Connectors, and Anchors:
 - 1. Hot-Dipped Galvanizing: ASTM A153.

2.7 SOURCE QUALITY CONTROL AND TESTS

- A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Shop test bolted and welded connections as specified for field quality control tests.
- C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify bearing surfaces are at correct elevation.
- B. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 PREPARATION

- A. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.

3.3 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- B. Field weld components and shear connectors indicated on Drawings.
- C. Field connect members with threaded fasteners; tighten to snug tight for bearing type connections.
- D. Do not field cut or alter structural members without approval of Architect/Engineer.
- E. After erection, touch up welds and abrasions to match shop finishes.

3.4 GROUT INSTALLATION

- A. Shim bearing plates and equipment supports to proper elevation, snug tighten anchor bolts.
- B. Fill void under bearing surface with grout. Install and pack grout to remove air pockets.
- C. Moist cure grout.
- D. Remove forms after grout is set. Trim grout edges to form smooth surface, splayed 45 degrees.

3.5 INSTALLING METAL BAR GRATINGS

- A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.
- C. Attach nonremovable units to supporting members by welding where both materials are same; otherwise, fasten by bolting as indicated above.

3.6 FIELD QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested work complied with or deviates from requirements.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements at no additional cost to the Owner.
- C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.
- D. Field-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 1. Direct-tension indicator gaps will be verified to comply with ASTM F 592, Table 2.
- E. In addition to visual inspection, field welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.
 - 1. Liquid Penetrant Inspection: ASTM E165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

3. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level “2-2T.”
 4. Ultrasonic inspection: ASTM E 164.
- F. In addition to visual inspection, field welded shear connectors will be inspected and tested according to requirements of AWS D1.1 for stud welding and as follows:
1. Bend test will be performed when visual inspections reveal either less than a continuous 360 degree flash or welding repairs to any shear connector.
 2. Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to requirements of AWS D1.1
- G. Contractor shall furnish all necessary staging, platforms, ladders, or other items necessary to facilitate the testing laboratory in testing and inspecting the work.
- H. The testing laboratory shall inspect 15% of the field full penetration welds, except at truss splices where 100% shall be inspected. All tested welds shall pass.
- I. The testing laboratory shall inspect 50% of the fillet welds and spot check gauge and length of all welds.

3.7 CLEANING

- A. Touch-up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
1. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.
- B. Touch up all hot dipped galvanized steel with high zinc dust content paint.
1. For re-galvanizing welds and steel, comply with SSPC-Paint 20.

END OF SECTION

SECTION 05 21 00
STEEL JOISTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. K-series and LH-series open web steel joists.
 - 2. Bracing.
- B. Related Sections:
 - 1. Section 051200 - Structural Steel.
 - 2. Section 053100 - Steel Decking.

1.2 REFERENCES

- A. FS TT-P-664D -- Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant; 1988.
- B. SJI Technical Digest No. 9 -- Handling and Erection of Steel Joists and Joist Girders; Steel Joist Institute; July 1987. Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; Steel Joist Institute (SJI); 1990.
- C. Steel Structures Painting Manual, Volume 2, Systems and Specifications; Steel Structures Painting Council (SSPC); 1991.

1.3 SYSTEM DESCRIPTION

- A. Provide joist system which is designed and fabricated to comply with requirements of the contract documents and which strictly conforms to material, manufacturing, and erection requirements of the Steel Joist Institute's (SJI) "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders" (referred to hereinafter as SJI "Specifications").
 - 1. Wind uplift: Design joists and connections to comply with wind uplift requirements indicated.

1.4 SUBMITTALS

- A. Product Data: Submit for each distinct type of joist required and for accessories.
- B. Shop Drawings: Drawings for fabrication and erection of joists; include plans, elevations, and large scale details of typical sections, special connections, joining, and accessories.
 - 1. Show location and spacing of joists; indicate mark number and type.
 - 2. Show bridging.
- C. Quality Control Submittals: Submit the following:
 - 1. SJI certification of joist characteristics.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Strictly conform to requirements of SJI Technical Digest No. 9.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel: Conform to requirements of SJI "Specifications."
- B. Steel Primer Joists: Rust-inhibitive, lead and chromate free, low VOC primer, complying with FS TT-P-664, or equivalent.
- C. Accessories: Provide accessories required for erection of steel joists, complying with SJI "Specifications" and with contract documents.

2.2 JOIST FABRICATION

- A. General: All materials shall be clean and straight.
- B. Bridging is not shown on the drawings. Detail and fabricate bridging in complete accordance with SJI requirements.
- C. Joists:
 - 1. Top chord extensions: Provide extensions where indicated. Extension members shall be designed as cantilever beams, with their reactions carried back at least to the first panel point of the joists.
 - 2. Bottom chords: Form bottom chord members of joists using angles.
 - 3. Bottom chord extensions: Where indicated, provide extended bottom chords or separate extension units properly designed to support ceilings attached directly to joist bottom chords. Maximum clearance between wall finish and end of extension: 1/2 inch, unless indicated otherwise.
 - 4. Special end connections: Provide special end connections where joists bear less than 2-1/2 inches over steel supports. Connections shall provide positive attachment to the support.
 - 5. Surface preparation for shop priming: SSPC-SP 2: Hand tool cleaning.
 - 6. Shop priming: Apply primer in accordance with paint manufacturer's recommendations.

PART 3 EXECUTION

3.1 ERECTION

- A. Do not begin joist erection until structural support components have been installed and are in suitable condition to receive joists.
- B. Do not overload or exceed carrying capacity of any joist during construction period.
- C. Accurately position and space joists before permanent attachment to structural supports.
- D. Provide safe, stable structure throughout construction period. Do not remove bridging after construction is completed, unless specifically authorized to do so by the architect.
 - 1. Install bridging in accordance with SJI requirements.
 - 2. Bridging installation shall proceed concurrently with joist erection and shall be completed before joists are subjected to construction loads.
- E. Joist Anchorage:
 - 1. Anchor joists to structural support members as indicated on drawings.

END OF SECTION

SECTION 05 31 00
STEEL DECK

PART 1 GENERAL

1.1 SCOPE

- A. This work shall consist of furnishing all plant, labor, materials, equipment, and apparatus for the installation of all steel roof decking and composite floor decking with accessories indicated, specified, and/or reasonably implied for a complete, first-quality job.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 033000 – Cast-in-Place Concrete
- B. Section 051200 - Structural Steel
- C. Section 052100 - Steel Joists

1.3 REFERENCE SPECIFICATIONS

- A. "Specification for the Design of Light Gage Cold-Formed Steel Structure Members" of the American Institute of Steel Construction.
- B. "Code of Recommended Standard Practice" of the Steel Deck Institute.
- C. Specifications and commentary for composite steel floor deck of the Steel Deck Institute.
- D. Specifications and commentary for steel roof deck of the Steel Deck Institute.
- E. Structural Welding Code - Sheet steel of the American Welding Society.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Qualifications of Welding: Use qualified processes and welding operators in conformance with AWS "Welder Qualification" procedures.
- C. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated
- D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
 - 2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency
- E. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- F. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

- G. Welding Inspection: All decking welds shall be inspected by the Architect prior to covering. Notify the Architect in writing forty-eight (48) hours prior to completing welds for each major area.

1.5 SUBMITTALS

- A. Shop and Erection Drawings shall be submitted for all metal decking to the Architect for approval. Drawings shall indicate layout, types of specified materials and accessories, gauges to be supplied, anchorage details, all conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories. Drawings shall include layout for all shear studs to be applied through deck units. Manufacture or fabricating of any materials or the performing of any work prior to the approval of shop drawings will be entirely at the risk of the Contractor.
- B. Product Data: For each type of deck, accessory, and product indicated
- C. The Contractor shall submit the manufacturer's specifications, load tables, and installation instructions for each type specified.
- D. Welding certificates and welding procedures (WPS)
- E. Field quality-control test and inspection reports.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Steel deck units shall be protected against damage in transit to the jobsite.
- B. If site storage is necessary, steel deck units shall be stacked on wood blocking clear of the ground and tilted slightly to insure against the entrapment of water.
- C. The steel deck units shall be hoisted to each individual floor as required and rough spread.

PART 2 PRODUCTS

2.1 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
 - 1. Galvanized Steel Sheet: ASTM A653, Structural Steel (SS), Grade 33.
 - 2. Galvanizing: ASTM A 525, G60.
 - 3. Deck Profile: Type B.
 - 4. Profile Depth: 1½”.
 - 5. Design Uncoated-Steel Thickness: 20 gauge.
 - 6. Span Condition: Triple span or more unless noted in drawings.
 - 7. Side Laps: Overlapped.
- B. Roof Deck: (3 inch deep) Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
 - 1. Galvanized Steel Sheet: ASTM A653, Structural Steel (SS), Grade 50.
 - 2. Galvanizing: ASTM A 525, G60.
 - 3. Deck Profile: Type N.
 - 4. Profile Depth: 3-inches.
 - 5. Design Uncoated-Steel Thickness: 20 gauge.
 - 6. Span Condition: Triple span or more.

7. Side Laps: Overlapped.

2.2 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Weld Washers: Mild steel, uncoated, sized as recommended by manufacturer of steel deck units.
- C. Mechanical Fasteners: Stainless steel, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- D. Side-Lap Fasteners: Stainless steel, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile indicated.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.
- I. Galvanizing Repair Paint: High zinc-dust content paint formulated specifically for repair of damaged galvanized surfaces. Prepare surfaces and repair in accordance with procedures specified in ASTM A 780.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.
- J. Holes for openings: Deck shall be cut by the Contractor to fit large framed openings which are located by dimension on the structural design drawings. Holes required by other trades shall be supplied at the expense of those trades. The trade involved shall notify the Architect/Engineer regarding the size, location and number of holes so that the structural adequacy of the steel deck units and/or composite slab can be checked. Holes shall be cut in floor deck units only after concrete has been placed and 75% of design strength attained.

3.3 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members as indicated on the drawings
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports as indicated on the drawings.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum.
- D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
 - 1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.
- E. Flashing: The steel deck manufacturer shall furnish sheet metal flashings to close openings between deck units and columns, deck units and girders, and openings which occur where deck abut. These flashings shall be welded in position by the steel deck installer.
- F. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12" with at least one weld at each corner.
- G. Closure Strips: Provide flexible closure strips at open uncovered ends and edges of roof decking also in voids between decking and other construction. Install with adhesive in accordance with manufacturer's instructions.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field welds will be subject to inspection.
- C. Additional testing will be performed to determine compliance of corrected work with specified requirements.
- D. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- E. Remove and replace work that does not comply with specified requirements.

- F. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS AND PROTECTION

- A. Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Division 9 Section "Interior Painting."
- B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 40 00
COLD FORMED STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
1. Interior non-load bearing wall framing.
- B. Related Sections include the following:
1. Division 5 Section "Metal Fabrications" for masonry shelf angles and connections.
 2. Division 9 Section "Gypsum Board Assemblies" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated.
 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 1. Exterior Non-Load-Bearing Framing at Brick Veneer: 1/600 of span.
 2. Exterior Non-Load-Bearing Framing at Metal Panel Veneer: 1/360 of span.
 3. Exterior Soffit Framing: 1/360.
 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 1/2 inch.
- B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."

1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."
2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

1.4 SUBMITTALS

- A. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
 1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Welding certificates.
- D. Qualification Data: For professional engineer.
- E. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
 1. Steel sheet.
 2. Expansion anchors.
 3. Power-actuated anchors.
 4. Mechanical fasteners.
 5. Vertical deflection clips.
 6. Horizontal drift deflection clips
 7. Miscellaneous structural clips and accessories.
- F. Research/Evaluation Reports: For cold-formed metal framing.

1.5 QUALITY ASSURANCE

- A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.
- B. Professional Engineer Qualifications: A professional engineer registered in the State of North Carolina and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.
- C. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

- D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- E. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
 - 1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
 - 2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."
- F. Comply with AISI's "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."
- G. 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. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Allied Studco.
 - 2. AllSteel Products, Inc.
 - 3. California Expanded Metal Products Company.
 - 4. Clark Steel Framing.
 - 5. Consolidated Fabricators Corp.; Building Products Division.
 - 6. Craco Metals Manufacturing, LLC.
 - 7. Custom Stud, Inc.
 - 8. Dale/Incor.
 - 9. Design Shapes in Steel.
 - 10. Dietrich Metal Framing; a Worthington Industries Company.
 - 11. Formetal Co. Inc. (The).
 - 12. Innovative Steel Systems.
 - 13. MarinoWare; a division of Ware Industries.
 - 14. Quail Run Building Materials, Inc.
 - 15. SCAFCO Corporation.
 - 16. Southeastern Stud & Components, Inc.
 - 17. Steel Construction Systems.
 - 18. Steeler, Inc.

19. Super Stud Building Products, Inc.
20. United Metal Products, Inc.

2.2 MATERIALS

- A. Steel Sheet: ASTM A1003, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 1. Grade: ST33H or as required by structural performance.
 2. Coating: G60 or equivalent.
- B. Steel Sheet for Vertical Deflection and Drift Clips: ASTM A653, structural steel, zinc coated, of grade and coating as follows:
 1. Grade: 50, Class 1 or 2.
 2. Coating: G90.

2.3 CEILING JOIST FRAMING

- A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
 1. Minimum base-metal thickness: 0.0329 inch.
 2. Flange width: 1-5/8 inches, minimum.

2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A1003, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 1. Supplementary framing.
 2. Bracing, bridging, and solid blocking.
 3. Web stiffeners.
 4. Anchor clips.
 5. End clips.
 6. Foundation clips.
 7. Gusset plates.
 8. Stud kickers, knee braces, and girts.
 9. Joist hangers and end closures.
 10. Hole reinforcing plates.
 11. Backer plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36, zinc coated by hot-dip process according to ASTM A123.

- B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel; carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

- A. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C1107, with fluid consistency and 30-minute working time.
- B. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- C. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.7 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
 - 4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
- B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
1. Cut framing members by sawing or shearing; do not torch cut.
 2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

- a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
 - F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
 - G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
 - H. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
 - I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
 - J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to bottom track, unless otherwise indicated. Space studs as follows:
 1. Stud Spacing: As indicated on Shop Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support, using one of the following:
 1. Install single-leg deflection tracks and anchor to building structure.
 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 3. Connect vertical deflection clips to studs and anchor to building structure.
 4. Connect drift clips to cold formed metal framing and anchor to building structure.
- E. Install horizontal bridging of the types listed below in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - a. Install solid blocking at 96-inch centers.
 2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes shop fabricated metal items:
 - 1. Lintels.
 - 2. Ledge and shelf angles.
 - 3. Bollards.
 - 4. Ladders.
 - 5. Structural supports for miscellaneous attachments.
 - 6. Anchor bolts for sill plates.

- B. Related Requirements:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in concrete.
 - 2. Section 04 20 00 - Unit Masonry: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in masonry.
 - 3. Section 05 12 00 - Structural Steel: Structural steel column anchor bolts.
 - 4. Section 05 21 00 - Steel Joist: Structural joist bearing plates, including anchorage.
 - 5. Section 05 31 00 - Steel Deck: Bearing plates for metal deck bearing, including anchorage.
 - 6. Section 05 52 00 - Metal Railings.
 - 7. Section 09 90 00 - Painting and Coating: Field applied paint finish.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

- B. American National Standards Institute (ANSI):
 - 1. ANSI A14.3 - Ladders - Fixed - Safety Requirements; 2014, Reaffirmed 2018.

- C. ASTM International (ASTM):
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
 - 2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
 - 3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
 - 4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
 - 5. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
 - 6. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021a.
 - 7. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts; 2021a.
 - 8. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
 - 9. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.

10. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2018, Editorial Revisions 2018.
 11. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings; 2018, Editorial Revisions 2018.
 12. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 13. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2019a.
 14. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.
 15. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
 16. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
 17. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel; 2021.
 18. ASTM F436/F436M - Standard Specification for Hardened Steel Washers; 2019.
 19. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2022.
- D. American Welding Society (AWS):
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
 2. AWS B2.1/B2.1M - Specification For Welding Procedure And Performance Qualification; 7th Edition; 2021.
 3. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, Errata 2023.
 4. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, Errata 2020.
- E. California Department of Public Health (CDPH):
1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- F. International Accreditation Service (IAS):
1. IAS AC172 - Accreditation Criteria For Fabricator Inspection Programs For Structural Steel; 2019.
- G. National Ornamental & Miscellaneous Metals Association (NOMMA):
1. NOMMA Guideline 1 - Joint Finishes.
- H. The Society for Protective Coatings (SSPC):
1. SSPC Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
 2. SSPC Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.
 3. SSPC SP 2 - Hand Tool Cleaning; 2018.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Where anchors or support brackets to structure penetrate finish and moisture protection materials, coordinate fabrication of those finish and moisture protection materials to provide for weather sealed finish condition (e.g., exterior mounted ladders, etc.).

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Designer's Qualification Statement: Licensed Engineer.
- D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.
- E. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M.

1.5 QUALITY ASSURANCE

- A. Finish joints in accordance with NOMMA Guideline 1.
- B. Perform Work in accordance with applicable codes and standards in the State in which the project is located.
- C. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Design under direct supervision of Professional Engineer experienced in design of this Work and licensed in State in which the project is located.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than twelve (12) months before start of scheduled welding work.
- C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel:
 - 1. Structural W-Shapes: ASTM A992/A992M.
 - 2. Structural Shapes: ASTM A36/A36M.
 - 3. Channels and Angles: ASTM A36/A36M.
 - 4. Steel Plate: ASTM A36/A36M.
 - 5. Hollow Structural Sections: ASTM A500/A500M, Grade B.
 - 6. Steel Pipe: ASTM A53/A53M, Grade B, Schedule 40.
 - 7. Sheet Steel: ASTM A653/A653M, Grade 33 Structural Quality, galvanized.
 - 8. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563/563M nuts and ASTM F436/F436M washers.

9. Structural Bolts, Nuts and Washers: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class B.
 10. Welding Materials: AWS D1.1; type required for materials being welded.
 11. Shop Primer: SSPC Paint 15, Type 1, red oxide.
 12. Touch-Up Primer:
 - a. Shop Primer: Match shop primer.
 - b. Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.
 - c. Interior Anti-Corrosive Paints: Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
- B. Aluminum:
1. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
 2. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.
 3. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
 4. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
 5. Aluminum-Alloy Sand Castings: ASTM B26/B26M.
 6. Aluminum -Alloy Die Castings: ASTM B85/B85M.
 7. Bolts, Nuts, and Washers:
 - a. Stainless steel.
 8. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.2 LINTELS

- A. Lintels: Steel sections, size and configuration as indicated on Drawings, length to allow 8 inches minimum bearing on both sides of opening.
1. Exterior Locations: Finish to ASTM A123/A123M, hot dip galvanized after fabrication.
 2. Interior Locations: Finish to be primer paint, two coats.

2.3 LADDERS

- A. Ladder type as indicated on Drawings.
1. Interior Steel Ladder: Comply with ANSI A14.3, Steel welded construction:
 - a. Side Rails: 3/8 x 2 inches side rails spaced at 20 inches.
 - b. Rungs: one inch diameter solid rod spaced 12 inches o.c.
 - c. Mounting: Space rungs 7 inches from wall surface; with steel mounting brackets and attachments. Mounting brackets attached as indicated on Drawings, but not greater than 48 inches apart.
 - d. Finish:
 - 1) Interior Ladders: Primer paint, two coats.
 - 2) Exterior Ladders: Hot dip galvanized after fabrication unless paint or powder coat finish indicated on Drawings.
 2. Exterior Aluminum Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
 - a. Components: Manufacturer's standard side rails, rungs, treads, handrails, returns, platforms, and safety devices complying with the requirements of the MATERIALS article of this section.
 - b. Materials: Aluminum; ASTM B221 (ASTM B221M), 6063 alloy, T52 temper.
 - c. Mounting: Space rungs 7 inches from wall surface; with metal mounting brackets and attachments. Mounting brackets attached as indicated on Drawings, but not greater than 36 inches apart.
 - d. Finish:
 - 1) Clear anodized coating in compliance with AAMA 611, Class 1.

2.4 STRUCTURAL SUPPORTS

- A. Other Structural Supports: Steel sections, shape and size as indicated on Drawings required to support applied loads with maximum deflection of 1/240 of the span; prime paint, one coat.

2.5 ANCHOR BOLTS

- A. Anchor Rods: ASTM A307; Grade A.
 - 1. Shape: Hooked and straight.
 - 2. Furnish with nut and washer; unfinished.

2.6 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fit and shop assemble items in largest practical sections, for delivery to site.
- C. Fabricate items with joints tightly fitted and secured.
- D. Continuously seal joined members by continuous welds.
- E. 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.
- F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- H. Railing Assemblies, wall rails, and attachments to resist force of 75 lbs at any point without damage or permanent set.

2.7 FACTORY APPLIED FINISHES

- A. Finishes as follows unless indicated otherwise on Drawings or in component description in this Section.
- B. Steel - Interior Use:
 - 1. Shop Prime Paint items with two coats except where galvanizing is specified.
 - a. Prepare surfaces to be primed in accordance with SSPC SP 2.
 - b. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
 - c. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
- C. Steel - Exterior Use:
 - 1. Galvanizing: ASTM A123/A123M; minimum 1.7 oz/sq ft coating thickness; hot dip galvanized after fabrication.
 - 2. Galvanizing for Fasteners, Connectors, and Anchors: Hot dip galvanized to ASTM A153/A153M, Class B, unless specifically indicated as Mechanical Galvanized.
 - a. Mechanical Galvanizing: ASTM B695; Class 50 minimum.
- D. Aluminum:
 - 1. Exterior Aluminum Surfaces: Class I natural anodized.
 - 2. Interior Aluminum Surfaces: Class I natural anodized.
 - 3. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.8 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.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify field conditions are acceptable and are ready to receive Work.
- C. Verify field measurements are as required for installation.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Clean and strip primed steel items to bare metal where site welding is required.
- D. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install items plumb and level, accurately fitted, free from distortion or defects.
- C. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.
- D. Field weld components indicated on shop drawings.
- E. Perform steel field welding in accordance with AWS D1.1 - Structural Welding Code.
- F. Perform aluminum field welding in accordance with AWS D1.2 - Structural Welding Code.
- G. Obtain approval of Architect prior to site cutting or unscheduled adjustments.
- H. After erection, touch up welds, abrasions, and damaged finishes:
 - 1. Steel - Apply prime paint or galvanizing repair paint to match shop finishes.
 - 2. Aluminum – Repair finish to match shop finishes.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/4 inch per story or for every 12 feet in height whichever is greater, non-cumulative.
- C. Maximum Offset from Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation and testing.
- B. Welding: Inspect steel welds in accordance with AWS D1.1.
- C. Welding: Inspect aluminum welds in accordance with AWS D1.2.

END OF SECTION

SECTION 06 10 53
MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Roof curbs and perimeter nailers.
 - 2. Blocking in wall and roof openings.
 - 3. Communications and electrical panel back boards.
 - 4. Fire-retardant treatment of wood.
 - 5. Preservative treatment of wood.
- B. Related Requirements:
 - 1. Drawings and Specification Sections required materials in this Section and not indicated otherwise.

1.2 REFERENCES

- A. American Lumber Standard Committee (ALSC):
 - 1. ALSC PS 20 - American Softwood Lumber Standard; 2020, Revised 2021.
- B. The Engineered Wood Association (APA):
 - 1. APA PS 1 - Structural Plywood; 2020.
 - 2. APA PS 2 - Performance Standard for Wood Structural Panels; 2018, Revised 2020.
- C. American Wood-Preservers Association (AWPA):
 - 1. AWPA U1 - Use Category System: User Specification for Treated Wood; 2023.
- D. ASTM International (ASTM):
 - 1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023a.
 - 2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
 - 3. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood; 2003, Reapproval 2017.
 - 4. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing; 2019a.
 - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- E. Southern Pine Inspection Bureau, Inc. (SPIB):
 - 1. SPIB - Standard Grading Rules for Southern Pine Lumber; 2021.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit technical data on wood products, preservative and fire retardant treatment materials, and application instructions.

1.4 QUALITY ASSURANCE

- A. Grading Agency: Any grading agency acceptable to the Authority Having Jurisdiction and 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. Perform Work in accordance with the following:
 - 1. Dimension Lumber: Comply with ALSC PS 20 and requirements of specified grading agencies.
 - 2. Wood Construction Panels:
 - a. Plywood: Comply with APA PS 1 and requirements of specified grading agencies.
 - b. Oriented Strand Board (OSB): Comply with APA PS 2 and requirements of specified grading agencies.
- C. Surface Burning Characteristics:
 - 1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- D. Apply label from agency approved by Authority Having Jurisdiction to identify each preservative treated and fire retardant treated material.

PART 2 PRODUCTS

2.1 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB.
- B. Sizes: Nominal sizes as indicated on Drawings, S4S (surfaced on 4 sides).
- C. Moisture Content: S-dry or MC19 (19 percent maximum moisture content).
- D. Stud Framing for sizes 2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm):
 - 1. Species: Southern Pine.
 - 2. Grade: No.2.
- E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S (surfaced on 4 sides), No.2 or Standard Grade.
 - 2. Boards: Standard or No.3.

2.2 CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: APA PS 1, A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; Fire Retardant Treated as indicated in this Section; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- B. Other Applications:
 - 1. Plywood Concealed From View But Located Within Exterior Enclosure: APA PS 1, C-C Plugged or better, Exterior grade.
 - 2. Plywood Exposed to View But Not Exposed to Weather: APA PS 1, A-D or better.
 - 3. Other Locations: APA PS 1, C-D Plugged or better.

2.3 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. Anchors:
 - a. Toggle bolt type for anchorage to hollow masonry.
 - b. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
 - c. Bolt or ballistic fastener for anchorages to steel.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
 1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.
- C. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

2.4 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 1. 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 AWWA standards.
- B. Fire Retardant Treatment:
 1. Exterior Type: AWWA U1, Use 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. Fire retardant treatment required as follows:
 - 1) All exterior rough carpentry items.
 2. Interior Type: AWWA 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. Fire retardant treatment required as follows:
 - 1) All interior rough carpentry items.
- C. Preservative Treatment:
 1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.10 lb/cu ft retention.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber as indicated on Drawings.
 - c. Treat lumber exposed to weather.
 - d. Treat lumber in contact with roofing, flashing or waterproofing.
 - e. Treat lumber in contact with masonry or concrete.
 - f. Treat lumber less than 18 inches above grade.
 2. Preservative Pressure Treatment of Plywood Above Grade: AWWA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
 - a. Kiln dry plywood after treatment to maximum moisture content of 15 percent.

- b. Treat plywood as indicated on Drawings.
 - c. Treat plywood in contact with roofing, flashing or waterproofing.
 - d. Treat plywood in contact with masonry or concrete.
 - e. Treat plywood less than 18 inches above grade.
3. Preservative Pressure Treatment of Lumber in Contact with Soil: AWP A U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.31 lb/cu ft retention.
- a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber as indicated on Drawings.
 - c. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
 - d. 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 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate conditions are ready to receive blocking, curbing, and framing.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Coordinate placement of blocking, curbing and framing items.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Set members level and plumb, in correct position.
- C. Place horizontal members, crown side up.
- D. Except where prefabricated roof curbs are indicated and unless specified otherwise in specification sections for roofing construction, construct curb members of solid wood sections and form corners by alternating lapping side members.
- E. Coordinate curb installation with installation of decking and support of deck openings, and parapet construction.
- F. Communications and Electrical Room Mounting Boards: Coordinate and size mounting boards 12 inches beyond size of panels, devices and wiring to be mounted.

END OF SECTION

SECTION 06 61 16
SOLID SURFACING FABRICATIONS

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Opaque Solid Surfacing Fabrications.
- B. Related Requirements:
 - 1. Sections describing substrates and construction receiving solid surface fabrications.

1.2 REFERENCE STANDARDS

- A. ASTM International (ASTM):
 - 1. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
 - 2. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2023.
 - 3. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine; 2017.
 - 4. ASTM D2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of plastics; 2022.
 - 5. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products; 2017.
 - 6. ASTM D6670 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products; 2018.
 - 7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- B. International Surface Fabricators Association (ISFA):
 - 1. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
 - 2. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material; 2013.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data on the products, accessories, and fabrications indicated.
- C. Shop Drawings: Indicate dimensions, thicknesses, required clearances, tolerances, materials, colors, finishes, fabrication details, field jointing, adjacent construction, design load parameters, methods of support, integration of plumbing components, and anchorages. Indicate preparation of opening required, rough-in sizes; provide templates for cast-in or placed frames or anchors; tolerances for item placement, and temporary bracing of components.
- D. Samples for Initial Selection: Two manufacturer's complete set of color charts illustrating the full range of patterns, finishes and colors available for solid surface fabrications and sealants; 3 x 4 inch samples; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection; each sample to be 12 x12 inches illustrating actual fabrication construction; include fastener hardware. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Maintenance Data: Indicate list of approved cleaning materials and procedures required; list of substances that are harmful to the component materials.
- C. Include instructions for stain removal, and surface and gloss restoration.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five (5) years of documented experience.

1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Opaque Solid Surfacing:
 - 1. Manufacturer Warranty: Provide manufacturer's standard warranty for material only covering defects and/or deficiencies in the Work. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Owner and at no cost to Owner.
 - 2. Warranty Period: Ten (10) years beginning on date of Substantial Completion.

1.7 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 - 1. Liquids and Creams: 16 oz. of recommended products for cleaning, sealing, and polishing installed Work.

PART 2 PRODUCTS

2.1 OPAQUE SOLID SURFACING

- A. Nonporous, densified, homogeneous surfacing materials composed of polyester or acrylic resins, fillers, color chips, and pigment and performance-enhancing additives.
 - 1. Standard Type: Comply with minimum performance and engineering properties of ISFA 2-01.
 - 2. Surface Burning Characteristics: Class A in accordance with ASTM E84.
 - a. Maximum 25/25 flame spread/smoke developed index.
 - 3. Resin: Polyester or Acrylic type, with integral coloring, stain resistant to domestic chemicals and cleaners.
- B. Size and Configuration: As indicated on Drawings.
- C. Corners and Edges Profile:
 - 1. Radius 1/4 inch, unless indicated otherwise on Drawings.
 - a. Edge double radius, top and bottom.
- D. Color and Finish:
 - 1. As selected by Architect from manufacturer's full range.
- E. Manufacturers:
 - 1. Corian (by DuPont).

2. Staron (by Lotte Advanced Materials).
 3. Wilsonart Contract.
 4. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Basis of Design:
1. Corian.

2.2 FABRICATION

- A. Design fabrications with sufficient strength for applicable stresses during handling, installation, and use after installation. Embed anchors and stiffening members as required.
- B. Fabricate components by mold to achieve shape and configuration.
- C. Thicknesses, profiles, and configurations to be as indicated on Drawings.
- D. Finish exposed surfaces smooth and polished to a required sheen.
 1. Polishing Creams and Materials: As recommended by surfacing manufacturer to achieve specified finish sheen.
- E. Fabricate and finish components in shop to greatest extent practical to sizes and shapes indicated, in accordance with Drawings and surfacing material manufacturer's requirements.
- F. Form joints between components to be without conspicuous or telegraphing joints. Comply with surfacing manufacturer's recommendations for bonding materials and methods.
- G. Fabricate components to provide for mounting and anchorage materials and devices to be concealed from view, unless indicated otherwise on Drawings.
- H. Provide and finish factory penetration cutouts for elements of other construction to include, but not limited to, plumbing fittings and bath accessories as indicated on Drawings.
- I. Fabricate and install without blistering, discoloration, chipping, or cracking components.
- J. Cure components prior to shipment.
- K. Fabrication Tolerances:
 1. Maximum Variation from Specified Thicknesses: 1/16 inch (1.59 mm).
 2. Maximum Variation from Specified Dimensions: 1/8 inch (3.18 mm).
 3. Maximum Variation from Dimensioned Cutout Locations: 1/8 inch (6.35 mm).

2.3 ACCESSORIES

- A. Adhesive: Type recommended by solid surface manufacturer and coordinated for bonding to substrate type; not containing formaldehyde or volatile organic compounds.
- B. Fasteners and Anchors: Non-corrosive type; concealed from view.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that surfaces and conditions are ready to accept the work of this Section. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Examine products to be installed for damage and other conditions detrimental to completion of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Verify that field measurements are as indicated.

- E. Verify that joint preparation and affected dimensions are acceptable.
- F. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Provide anchoring devices for installation and embedding.
- D. Provide templates and rough-in measurements.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install components in accordance with Drawings and approved shop drawings and manufacturer's instructions.
- C. Align work plumb and level.
- D. Mounting and anchorage materials and devices to be concealed from view, unless indicated otherwise on Drawings.
- E. Rigidly anchor and secure to substrate to prevent misalignment and delamination from substrate.
- F. Seal joints at junctions to other construction elements with joint sealant compatible with material type being sealed. Sealant to be paintable and colored as selected by Architect.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From True Dimension: 1/8 inch.
- C. Maximum Offset From True Position: 1/8 inch.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean and polish surfaces in accordance with manufacturer's instructions.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit construction near unprotected surfaces.

END OF SECTION

SECTION 07 11 00
DAMPPROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Bituminous dampproofing.
- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry.

1.2 REFERENCE STANDARDS

- A. ASTM International (ASTM):
 - 1. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal; 2011, Reapproval 2018.
 - 2. ASTM D1227/D1227M - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing; 2013, Editorial Revisions 2019.
- B. National Roofing Contractors Association (NRCA):
 - 1. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide properties of primer, bitumen, and mastics.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.4 QUALIFICATIONS

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years experience.

1.5 FIELD CONDITIONS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
 - 1. Henry Company: www.henry.com.
 - 2. Karnak Corporation: www.karnakcorp.com.
 - 3. Mar-Flex Systems, Inc: www.mar-flex.com/sle.
 - 4. W.R. Meadows, Inc: www.wrmeadows.com/sle.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 DAMPPROOFING PRODUCTS

- A. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.
 - 1. Composition - Vertical Application: ASTM D1227/D1227M Type III or ASTM D1187/D1187M Type I.
 - 2. Composition - Horizontal and Low-Slope Application: ASTM D1227/D1227M Type II or III.
 - 3. VOC Content: Not more than permitted by local, State, and federal regulations.
 - 4. Applied Thickness: 1/16 inch (1.5 mm), minimum, wet film. Provide thicker wet film if recommended by dampproofing manufacturer.
- B. Primers, Mastics, and Related Materials: Type as recommended by dampproofing manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify existing conditions before starting work.
- C. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- D. Verify that items that penetrate surfaces to receive dampproofing are securely installed.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect adjacent surfaces not designated to receive dampproofing.
- D. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- E. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- F. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Perform work in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- C. Install dampproofing system to surfaces and locations as indicated on Drawings
- D. Prime surfaces in accordance with manufacturer's instructions.
- E. Apply dampproofing with tools or equipment as recommended by manufacturer.
- F. Apply dampproofing at a temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.

- G. Apply each coat of dampproofing in continuous and uniform coat at a rate of 1 gal per 25 sq ft.
- H. Seal penetrations and items projecting through dampproofing surface. Seal watertight with mastic compatible and recommended by dampproofing manufacturer.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect work from damage.

END OF SECTION

SECTION 07 13 00
SHEET WATERPROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Self-adhered modified bituminous sheet membrane system.
- B. Related Requirements:
 - 1. Section 03 30 00 - Cast-in-Place Concrete: Concrete substrate.
 - 2. Section 07 21 00 - Thermal Insulation: Insulation used for protective cover.
 - 3. Section 07 62 00 - Sheet Metal Flashing and Trim: Counterflashing.
 - 4. Section 07 90 00 - Joint Protection: Joint sealing of substrate required prior to installation of work of this section.
 - 5. Sections related to collection, piping, and drainage of ground water.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C366/C366M - Standard Test Methods for Measurement of Thickness of Sandwich Cores; 2016, Editorial Revisions 2022.
 - 2. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2016, Reapproval 2021.
 - 3. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.
 - 4. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2018.
 - 5. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998, Reapproval 2017.
 - 6. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2016, Reapproval 2023.
 - 7. ASTM D1777 - Standard Test Method for Thickness of Textile Materials; 1996, Reapproval 2019.
 - 8. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test); 2008, Reapproval 2023.
 - 9. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
 - 10. ASTM D3776/D3776M - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric; 2020.
 - 11. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2022.
 - 12. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a, Reapproval 2023.
 - 13. ASTM D4716/D4716M - Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head; 2022.
 - 14. ASTM D5261 - Standard Test Method for Measuring Mass per Unit Area of Geotextiles; 2010, Reapproval 2018.
 - 15. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems; 2018.

16. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 2020.
 17. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, Editorial Revisions 2023.
 18. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2013, Reapproval 2019.
- B. National Roofing Contractors Association (NRCA):
1. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data for water proofing system components and accessories. Data to include, but is not limited to, surface conditioners, primers, flexible flashings, joint cover sheet, and joint and crack sealants, with temperature range for application of waterproofing membrane. Include product data for drainage panel and protection board.
- C. Shop Drawings: Indicate details for joint, corner, termination conditions, drainage panel and protection board. Include conditions of interface with other materials and construction such as drainage.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's qualifications certification.
- F. Installer's qualifications certification.
- G. Manufacturer's Installation Instructions: Indicate special procedures.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA (WM) - Waterproofing Manual.
- B. Sheet Waterproofing System: All materials, components, and accessories are to be as recommended by manufacturer of sheet waterproofing membrane material.

1.7 QUALIFICATIONS

- A. Membrane Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five (5) years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three (3) years of documented experience.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Maintain ambient temperatures above 40 degrees F (5 degrees C) for 24 hours before and during application and until liquid or mastic accessories have cured.

1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's Warranty: Provide five (5) year warranty to correct waterproofing system work that fails to resist penetration of water. Remedial work is to include removal and replacement of materials concealing waterproofing at no extra cost to Owner.
 - 1. Exception: 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 MEMBRANE MATERIALS

- A. Self-Adhered Modified Bituminous Sheet Membrane:
 - 1. Manufacturers:
 - a. Carlisle Coatings & Waterproofing Inc. - MiraDRI 860/861.
 - b. GCP Applied Technologies - Bituthene 3000.
 - c. Henry Company - Blueskin WP 200.
 - d. Polyguard Products, Inc. - 650 Membrane.
 - e. W.R. Meadows, Inc. - MEL-ROL Series.
 - f. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Thickness: 60 mil, 0.060 inch (1.5 mm), minimum.
 - 3. Sheet Width: 36 inch (0.914 m) roll width, minimum.
 - 4. Tensile Strength:
 - a. Film: 5000 pounds per square inch (34.57 MPa), minimum, measured according to ASTM D882 and at grip-separation rate of 2 inches (50 mm) per minute.
 - b. Membrane: 325 pounds per square inch (2.24 MPa), minimum, measured according to ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches (50 mm) per minute.
 - 5. Elongation at Break: 300 percent, minimum, measured according to ASTM D412.
 - 6. Water Vapor Permeance: Less than 0.1 perms, measured in accordance with ASTM E96/E96M.
 - 7. Low Temperature Flexibility: Unaffected when tested according to ASTM D1970/D1970M at minus 15 degrees F (or less), 180 degree bend on 1 inch (25 mm) mandrel.
 - 8. Peel Strength: 7 pounds per inch (1226 N/m), minimum, when tested according to ASTM D903.
 - 9. Lap Adhesion Strength: 5 pounds per inch (875.6 N/m), minimum, when tested according to ASTM D1876.
 - 10. Puncture Resistance: 48 pounds minimum, measured in accordance with ASTM E154/E154M.
 - 11. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.

12. Hydrostatic Resistance: Resists the weight of 200 feet (61 m) when tested according to ASTM D5385/D5385M.
 13. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
- B. Seaming Materials: As recommended by membrane manufacturer.
 - C. Membrane Sealant: As recommended by membrane manufacturer.
 - D. Flexible Flashings: As recommended by membrane manufacturer.
 - E. Termination Bars: Aluminum; compatible with membrane and adhesives.
 - F. Surface Conditioner: As recommended by membrane manufacturer.
 - G. Adhesives: As recommended by membrane manufacturer.
 - H. Thinner and Cleaner: As recommended by adhesive manufacturer; compatible with sheet membrane.

2.2 ACCESSORIES

- A. Sealant for Cracks and Joints in Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
- B. Drainage Panel: To be as recommended by waterproofing membrane manufacturer and as follows:
 1. Drainage layer with geotextile filter fabric on earth side. Minimum 4 feet width roll.
 2. Core: Dimpled polypropylene or high-impact polystyrene core.
 - a. Thickness: 0.40 inch minimum per ASTM D1777 or ASTM C366 (method B).
 - b. Compressive Strength: 11,000 psf minimum per ASTM D1621.
 - c. Water Flow Rate: 17 gal/min/ft minimum per ASTM D4716/D4716M,
 3. Geotextile Filter Fabric: Nonwoven polypropylene; adhered to each core dimple.
 - a. Weight: 4.0 oz/sy minimum per ASTM D3776/D3776M or ASTM D5261.
 - b. Tensile Strength: 100 lbs minimum per ASTM D4632/D4632M.
 - c. Water Flow Rate: 140 gal/min/sf per ASTM D4491/D4491M.
- C. Protection Board:
 1. Extruded Polystyrene Board as specified in Section 07 21 00 - Thermal Insulation.
 - a. 1 inch thick unless indicated otherwise on Drawings.
- D. Cant Strips: Premolded composition material and as recommended by membrane manufacturer.
- E. Flexible Flashings: Type recommended by membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify existing conditions are acceptable prior to starting this work.
- C. Verify substrate surfaces are durable and free of matter detrimental to adhesion or application of waterproofing system.
- D. Verify items that penetrate surfaces to receive waterproofing are securely installed.
- E. Verify substrate surface slopes to drain for horizontal waterproofing applications.

- F. Verify that intercepting drainage construction by others is ready to receive the work of this Section.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect adjacent surfaces from damage not designated to receive waterproofing.
- D. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions. Vacuum substrate clean.
- E. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- F. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.
- G. Seal moving cracks with sealant and non-rigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- H. Prepare building expansion joints at locations as indicated on drawings.
- I. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer and protect conditioner from rain or frost until dry.
- J. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate according to ASTM D5295/D5295M.
 - 1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease, and oil.
 - 2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, ruttled cracks, ragged corners, deviations in surface plane, spalling and delamination, as described in the reference standard.
 - 3. Remove and replace areas of defective concrete as specified in Section 03 30 00.
 - 4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in the referenced standard.
 - 5. Test concrete surfaces as described in the referenced standards. Verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Membrane:
 - 1. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
 - 2. Coordinate and provide drainage continuity with other drainage construction elements by others and indicated on Drawings.
 - 3. Roll out membrane and minimize wrinkles and bubbles.
 - 4. Self-Adhering Membrane: Remove release paper layer and roll out onto substrate with a mechanical roller. Install to full contact bond.
 - 5. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
 - 6. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
 - 7. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.
 - 8. Install building expansion joints at locations as indicated on drawings.

9. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
10. Seal membrane and flashings to adjoining surfaces.
 - a. Install termination bar along edges.
 - b. Install counterflashing over exposed edges.
- C. Drainage Panel:
 1. Coordinate and provide drainage continuity with other drainage construction elements by others and indicated on Drawings.
 2. Place drainage panel directly against membrane, butt joints, place to direct drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.
- D. Protection Board:
 1. Place protection board directly against drainage panel; butt joints. Scribe and cut boards around projections, penetrations, and interruptions.
 2. Adhere protection board to substrate with compatible adhesive.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from disturbance and damage.

END OF SECTION

SECTION 07 14 16
COLD FLUID-APPLIED WATERPROOFING

PART 1 GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Section Includes:
1. Surface preparation.
 2. Application of single-component, cold-applied, liquid waterproofing membrane.
- B. Related Requirements:
1. Section 03 30 00 - Cast-in-Place Concrete.
 2. Section 04 20 00 - Unit Masonry.
 3. Section 07 21 00 - Thermal Insulation.
 4. Section 07 62 00 - Sheet Metal Flashing And Trim.
 5. Section 07 90 00 - Joint Protection.

1.3 REFERENCES

- A. ASTM International (ASTM):
1. ASTM C1250 - Standard Guide for the Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1; 2019, Editorial Changes 2020.
 2. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension: 2016, Reapproval 2021.
 3. ASTM D2240 - Standard Test Method for Rubber Property—Durometer Hardness; 2015, Reapproval 2021.
 4. ASTM D2369 - Standard Test Method for Volatile Content of Coatings; 2020.
 5. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a. Editorial Changes 2023.

1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures.
- B. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
- C. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain waterproofing materials from a single manufacturer regularly engaged in manufacturing the product.
- B. Installer Qualifications: Installer to be experienced and have adequate number of skilled personnel who are thoroughly trained and experienced in the application of fluid applied waterproofing membranes.
- C. Regulatory Requirements: Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.7 MOCK-UP

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. Prior to installation of waterproofing membrane, apply waterproofing membrane to 100 sf of deck or wall to demonstrate surface preparation, crack and joint treatment, corner treatment, thickness, and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- C. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- D. Store at temperatures between 40 to 70 deg F (4 to 21 deg C).
- E. Protect materials during handling and application to prevent damage or contamination.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Product not intended for uses subject to abuse or permanent exposure to the elements.
- C. Do not apply membrane when air, material, or surface temperatures are expected to fall below 30 deg F (-1 deg C) within four hours of completed application.
- D. Do not apply membrane if rainfall is forecast or imminent within 12 hours.
- E. Do not apply waterproofing membrane to any surfaces containing frost.
- F. Consult manufacturer for applications to green concrete.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Waterproofing Membrane:
 - 1. Carlisle Coatings & Waterproofing, Inc.
 - 2. Henry Company.
 - 3. Tremco Commercial Sealants & Waterproofing.
 - 4. W.R. Meadows, Inc.
 - 5. Substitutions: Section 01 60 00 - Product Requirements.

- B. Basis of Design: W.R. Meadows, Inc.

2.2 MATERIALS

- A. Waterproofing Membrane: Single-component, cold-applied, solvent-free, non-shrink, liquid waterproofing membrane.
1. Physical Characteristics:
 - a. Solids Content by Weight: 98 percent, ASTM C1250.
 - b. Tensile Strength: 100 psi, ASTM D412.
 - c. Elongation at Break: 425 percent, ASTM D412.
 - d. Water Vapor Transmission: 0.10 perms, ASTM E96 (Method BW).
 - e. Shore 00 Hardness: 57, ASTM D2240.
 - f. VOC Content: 36 g/L, ASTM D2369.
 2. Basis of Design: W.R. Meadows, Inc. - Hydralastic 836 Waterproofing Membrane.

2.3 ACCESSORIES

- A. Waterproofing system components and materials to be as recommended by waterproofing membrane manufacturer.
- B. Accessory Joint Tape: 6 inches (150 mm) minimum width, reinforcing fabric for corners, crack, and joint treatment.
1. Basis of Design: W.R. Meadows, Inc. - Reinforcing Fabric HCR.
- C. Reinforced Joint Tape for outside corners subject to backfill.
1. Basis of Design: W.R. Meadows, Inc. - Precon Tape.
- D. Primer: Epoxy type.
1. Basis of Design: W.R. Meadows, Inc. - REZI-WELD LV or REZI-WELD LV STATE.
- E. Detailing Membrane.
1. Basis of Design: W.R. Meadows, Inc. - BEM.
- F. Concrete Repair Materials.
1. Basis of Design: W.R. Meadows, Inc. - Meadow-Patch 5 and Meadow-Patch 20 Concrete Repair Mortars.
- G. Waterproofing Protection Course.
1. Basis of Design: W.R. Meadows, Inc. - Perminator or Protection Course.
- H. Rolled Matrix Drainage System.
1. Basis of Design: W.R. Meadows, Inc. - Mel-Drain.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine surfaces to receive membrane. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.

- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect adjacent surfaces not designated to receive waterproofing.
- D. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- E. Do not apply waterproofing to surfaces unacceptable to manufacturer.
- F. Clean concrete surfaces so they are free of all coatings, dirt, oil, paints and any other contaminants.
- G. Patch all holes and voids and smooth out any surface misalignments.
- H. Remove and patch all concrete form ties.
- I. Priming:
 - 1. Apply the low viscosity epoxy with a nap roller or squeegee at a coverage rate of 150 - 200 sq.ft. per gallon (3.75 - 5.0 m²/L) providing a uniform coverage over the substrate.
 - 2. Allow the epoxy primer to become tack-free prior to the application of the fluid applied waterproofing membrane.
- J. Treatment of Existing Cracks and All Non-Structural Joints:
 - 1. Identify and install detailing membrane in all cracks and all non-structural joints.
 - 2. Apply a 30 wet mil coat of the fluid applied membrane ensuring that there is a minimum of 3 inches (75 mm) of membrane extending onto the wall in all directions.
 - 3. Embed the non-woven reinforcing fabric over the entire area of this membrane and work in using trowel.
 - 4. Completely cover the glass mesh with a second coat of the fluid applied membrane at 30 wet mils while the first coat is still wet, again extending 3 inches onto the wall in all directions.
- K. Treatment of Inside & Outside Corners:
 - 1. Install detailing membrane to create a minimum 3/4 inch fillet in all inside corners.
 - 2. Apply a 30 wet mil coat of the fluid applied membrane ensuring that there is a minimum of 3 inches (75 mm) of membrane extending onto the wall in all directions.
 - 3. Embed the non-woven reinforcing fabric over the entire area of this membrane and work in using trowel.
 - 4. Completely cover the glass mesh with a second coat of fluid applied membrane at 30 wet mils while the first coat is still wet, again extending 3 inches onto the wall in all directions.
 - 5. On outside corners subject to backfilling, install reinforced joint tape in lieu of fabric joint tape following the same procedure.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply waterproofing membrane system in accordance with manufacturer's instructions.
- C. Gently mix membrane prior to application.
- D. Apply membrane by trowel, flat-blade squeegee, or roller, at a minimum coverage rate of 25 sf per 1 U.S. gal (2.3 m²/3.78 L), providing a thickness of 60 mils wet.
- E. If a two-coat application is required, apply second coat as soon as possible with no more than eight hours between coats providing a minimum total thickness of 60 mils wet.
- F. Frequently inspect surface area to ensure proper adhesion and consistent thickness is achieved.

- G. Work material into any fluted rib forming indentations.
- H. Provide minimum cured membrane thickness of 60 mils dry.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect membrane with application of waterproofing protection course, drainage board, or other approved material.
- C. Backfill immediately using care to avoid damaging waterproofing membrane system.

END OF SECTION

SECTION 07 21 19
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes foamed-in-place insulation system.
- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry: Insulated masonry cavity walls.
 - 2. Section 07 21 00 - Thermal Insulation.
 - 3. Section 07 27 00 - Air Barriers.

1.2 REFERENCES

- A. Air Barrier Association of America (ABAA):
 - 1. ABAA - Quality Assurance Program (ABAA - QAP).
- B. American Association of Textile Chemists and Colorists (AATCC):
 - 1. AATCC 127 - Test Method for Water Resistance: Hydrostatic Pressure; 2018, Editorial Revisions 2019.
- C. ASTM International (ASTM):
 - 1. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission properties by Means of the Heat Flow Meter Apparatus; 2023.
 - 2. ASTM C1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation; 2020.
 - 3. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019, Reapproval 2022.
 - 4. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2016, Reapproval 2023.
 - 5. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2020.
 - 6. ASTM D1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics; 2017, Reapproval 2023.
 - 7. ASTM D6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics; 2021.
 - 8. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 9. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2023.
 - 10. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- D. FM Global (FM):
 - 1. FM 4880 - Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials; 2022.
- E. National Fire Protection Association (NFPA):
 - 1. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.
- F. Underwriters Laboratories Inc. (UL):
 - 1. UL 1040 - Standard for Safety Fire Test of Insulated Wall Construction; Current Edition, Including All Revisions.

2. UL 1715 - Standard for Safety Fire Test of Interior Finish Material; Current Edition, Including All Revisions.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination, scheduling, and sequencing.
- B. Coordinate the work of this Section with other adjacent and interfacing work.
- C. Sequence the work to permit installation of materials in conjunction with related materials and seals.

1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit product description, insulation properties, and preparation requirements.
- C. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention including around windows, and other special conditions.
- D. Manufacturer's Certificates:
 1. Certify products meet or exceed specified requirements.
 2. Provide test results from large-scale tests such as NFPA 286 (with acceptance criteria of Section 803.2), FM 4880, UL 1040 or UL 1715.
 - a. Such testing shall be related to the actual end-use configuration and be performed in the finished manufactured foam plastic assembly in the maximum thickness intended for use.

1.6 MOCKUP

- A. Section 01 40 00 - Quality Requirements: Requirements for mockup.
- B. Provide mockup as part of the mockup requirements for Section 04 20 00 - Unit Masonry.

1.7 QUALITY ASSURANCE

- A. Apply label from agency approved by authority having jurisdiction to identify each foam plastic component.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this Section, on projects of similar size, with minimum three (3) years documented experience and certified by manufacturer.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Temperature: Install work within range of ambient and substrate temperature, and moisture content recommended by the primary material manufacturer. Do not apply materials to a

- damp or wet substrate. Do not install materials when ambient temperature is lower than 50 degrees F unless manufacturer provides written approval.
- C. Field Conditions: Do not install work in snow, rain, fog, or mist. Do not install air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the material manufacturer.
 - D. Sequencing: Do not install work before the roof assembly and other construction has been sufficiently installed to prevent water infiltration into the substrate construction and building.
 - E. Compatibility: Do not allow materials to come in contact with chemically incompatible materials.
 - F. Ultra-Violet Exposure: Do not expose air barrier materials to sunlight longer than as recommended by the material manufacturer.

1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Requirements for warranties.
- B. Manufacturer's Warranty: Provide manufacturer's warranty covering against faulty materials in foamed-in-place insulation system, components, and accessories provided by manufacturer. Warranty duration to be five (5) years from date of Substantial Completion.
- C. Installer's Warranty: Provide installer's warranty covering against water intrusion and leaks in foamed-in-place insulation system, components, and accessories. Warranty duration to be two (2) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 GENERAL

- A. Regulatory Requirements: Comply with applicable codes for flame and smoke limitations.
- B. Application: Locations indicated on Drawings including, but not limited to, masonry cavity walls, and at junctions of dissimilar wall and roof materials to achieve thermal, dampproofing, and air barrier.
- C. All materials are to be compatible with the foamed-in-place insulation manufacturer's product.

2.2 FOAMED-IN-PLACE INSULATION

- A. Manufacturers:
 - 1. BASF Corporation - Walltite US.
 - 2. Henry Company - Permax 2.0X.
 - 3. Huntsman Building Solutions - Heatlok XT.
 - 4. Johns Manville - Corbond III.
 - 5. NCFI Polyurethanes - InsulBloc.
 - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: NCFI Polyurethanes - InsulBloc.
- C. Foamed-In-Place Insulation: Conforming to ASTM C1029, medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
 - 1. Closed Cell Content: 90 percent, minimum, in accordance with ASTM D6226.
 - 2. Thermal Resistance: R-value of 6.7, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.

3. Density: 2.0 pcf, minimum, in accordance with ASTM D1622.
4. Compressive Strength: 25 psi, minimum, in accordance with ASTM D1621.
5. Water Vapor Permeance: Vapor retarder; 1.3 perm, maximum, at 1.0 inch thick when tested in accordance with ASTM E96/E96M, desiccant method.
6. Air Permeance: 0.004 cfm per sq ft, maximum, at 1.57 psf pressure differential, in accordance with ASTM E2178.
7. Surface Burning Characteristics: ≤ 25 Flame Spread and ≤ 450 Smoke Developed, in accordance with ASTM E84.
8. Fungal Growth: None in accordance with ASTM C1338.

2.3 ACCESSORIES

- A. All accessories are to be compatible with the foamed-in-place insulation manufacturer's product.
- B. Primer: As recommended by insulation manufacturer.
- C. Joint Filler Foam: As recommended by insulation manufacturer.
- D. Joint Sealer: Single component polyurethane type and as recommended by foamed-in-place insulation manufacturer.
- E. Moisture Detection Paper Strips: MDP Strips.
- F. Mineral Wool: Mineral Wool Board, 4 pcf density.
- G. Transition Strips: Provide transition strips where difference in spray-applied thickness is greater than 2 inches. Strips are to be fastened directly to CMU, or other substrate, and provide transition backer no less than thickness of the larger depth requirement.
- H. Air Barrier Flashing Sheet Seal: Refer to Section 07 27 00 - Air Barriers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify Work within construction spaces or crevices are complete prior to insulation application.
- C. Verify surfaces are clean, dry, and free of matter capable of inhibiting adhesion work in this Section.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Prime substrate if required by manufacturer.
- D. Mask and protect adjacent surfaces from overspray or dusting.
- E. Mask areas where brick abuts concrete masonry at window and door jambs and other areas where brick abuts concrete masonry.
- F. Fill voids between masonry and structural steel and metal deck with mineral wool.
- G. Install Air Barrier Flashing at all openings and other locations as indicated on the Drawings. Lap seams one inch. Prime substrate as recommended by manufacturer.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply work in this Section in accordance with manufacturer's instructions.
- C. Apply insulation by spray method to uniform monolithic density without voids and seal around objects embedded or penetrating substrate.
- D. Apply to a cured thickness of not less than that indicated on Drawings and not greater than that indicated thickness plus 1/2 inch. Cured application is to comply with the specified R-value.
- E. Provide minimum of 2 inches overlap onto air barrier materials as indicated on Drawings.
- F. Install trim pieces for transition from full spray insulation to lesser spray thicknesses at more than 2 inches as per thickness indicated on the Drawings.
- G. Where applied to voids and gaps, allow space for expansion to avoid pressure on adjacent materials that may bind operable parts.
- H. Trim excess away for applied trim or remove as required for continuous sealant bead.
- I. Trim excess as required to not interfere with application of cladding or other cover systems by other trades.
- J. Patch damaged areas with same foam insulation product.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation and testing.
- B. Inspection will include verification of insulation thickness and density.
- C. Where damage occurs, which violates the insulation's thermal requirements, air seal and moisture seal, repair as needed using the specified spray polyurethane material or foam repair kit material approved by the manufacturer.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit subsequent construction work to damage the installed work of this Section.
- C. Protect the work of this Section from damage.

END OF SECTION

SECTION 07 22 16.10**ROOF INSULATION FOR MEMBRANE ROOFING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Roof insulation requirements for membrane roofing systems.
- B. Related Requirements:
 - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
 - 2. Division 07 - Thermal and Moisture Protection: Roofing membrane, roof drainage, accessories, sheet metal flashing. and trim.

1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
 - 1. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
 - 2. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
 - 3. ASTM C1303/C1303M - Standard Test Method for Predicting Long-Term Thermal Resistance of Closed-Cell Foam Insulation; 2023.
 - 4. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging; 2020.
 - 5. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method; 1983, Reapproval 2018.
 - 6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 7. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
 - 8. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C; 2024.
 - 9. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- C. International Code Council, Inc. (ICC); International Building Code (IBC):
 - 1. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. National Standard of Canada (CAN) / ULC Standards (ULC):
 - 1. CAN/ULC-S770 - Standard Test Method For Determination Of Long-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams; Reaffirmed 2020.
- E. Underwriters Laboratories Inc. (UL):
 - 1. UL (DIR) - Online Certifications Directory; Current Edition.
 - 2. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

- B. Meeting is to include coordination of requirements for roofing insulation and roofing membrane as a complete roofing system.
- C. Convene minimum one week prior to commencing work of roofing insulation and roofing membrane as a complete roofing system. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Submittals for roofing insulation and roofing membrane are to coincide as a complete roofing system.
- C. Product Data: Provide data for all materials specified.
- D. Shop Drawings: Indicating plans for fill and tapered insulation types including fastening and adhering details for each roof area.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: The requirements of this Section are to be provided by the same company that provides the roofing membrane and is to be an integral part of the overall roofing system.
- B. Requirements of this Section to be provided in accordance with the ICC (IBC).
- C. Requirements of this Section to be provided in accordance with the respective manufacturer's requirements and as a coordinated integral part of the overall roofing system.
- D. System components requiring UL certification but are not bearing UL label at point of delivery, shall be rejected.
- E. System components that are damaged or wetted before, during, or after installation shall be removed from the job site no later than the next working day from the day such damage or moisture contamination is noted.
- F. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five (5) years of documented experience.
- G. Installer Qualifications: Company specializing in performing the work of this Section with at least five (5) years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Materials shall be delivered in the manufacturer's original sealed and labeled shrouds and in quantities to allow continuity of application.
- C. Store materials in weather protected environment. Elevate materials minimum 4 inches above ground. Protect materials for moisture. Modify shipping shrouds and coverings as required to prevent condensation moisture contamination of materials.
- D. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- E. Protect foam insulation from direct exposure to sunlight and moisture.
- F. Remove damaged or deteriorated materials from the job site.

- G. Handle materials in manner as prevent damage and contamination with moisture or foreign matter.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Do not install materials during precipitation or other unsuitable weather. Contractor assumes all responsibility for starting installation in the event there is a probability of precipitation occurring during application.
- C. Do not apply roofing membrane when ambient temperature is outside of the most restrictive range recommendations of the manufacturers of materials.
- D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- F. Schedule applications so that no partially completed sections of roof are left exposed and without roofing membrane at end of workday.
- G. Prevent roofing construction materials, dust, and debris from entering the structure.

1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Warranty for the requirements of this Section shall be included in and shall be an integral part of the warranty requirements indicated for the roofing membrane as an overall roofing system warranty. Refer to Division 07 for roofing membrane specification.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Wind Design: Design and install the insulation system to withstand the required wind uplift pressures as specified in Division 07 for roofing membrane.

2.2 COMPONENTS

- A. Sheathing Board: Glass mat faced gypsum panels, ASTM C1177/C1177M, Type X, fire resistant type, 500 psi moisture resistant treated core, non-asphaltic primer surfacing, and tested in accordance with ASTM E84 and ASTM E136. Board Size shall be 4 x 8 feet and thickness shall be 5/8 inch.
 - 1. Manufacturers:
 - a. Georgia Pacific: DensDeck Prime Roof Board.
 - b. National Gypsum Company: DEXcell Glass Mat Roof Board.
 - c. USG Corporation: Securock Glass-Mat Roof Board.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
 - 2. Basis of Design: Georgia Pacific: DensDeck Prime Roof Board.
- B. Vapor Retarder Sheet:
 - 1. Self-Adhered Vapor Retarder: Self-adhering sheet composed of SBS modified bitumen and high-density polyethylene provided by membrane manufacturer and compatible with insulation, and other components of roof system; complying with requirements of fire rating classification. Cold-applied, with slip-resisting surface and

- release paper backing. Provide primer when recommended by vapor retarder manufacturer for substrate type.
- a. Sheet Thickness:
 - 1) 30 mils minimum.
 - b. Water Vapor Permeance: Maximum 0.1 perm, measured in accordance with ASTM E96/E96M.
- C. Polyisocyanurate (ISO) Insulation Board: Rigid closed-cell foam panels, complying with ASTM C1289.
1. Classifications:
 - a. Type II:
 - 1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
 - 2) Compressive Strength: Classes 1-2-3, Grade 3 - 25 psi (172 kPa), minimum.
 - 3) Thermal Resistance at 1.5 Inch Thick: 8.4 (1.48) LTTR, minimum when tested at 75 degrees F (24 degrees C) in accordance with ASTM C1303/C1303M or CAN/ULC-S770.
 2. Flame Spread Index (FSI): 25 to 75, tested in accordance with ASTM E84.
 3. Smoke Developed Index (SDI): 450 or less, tested in accordance with ASTM E84.
 4. Curing Time: 24 hours minimum, plus an additional 24 hours minimum per inch thickness, at a minimum of 60 degrees F before shipment from the manufacturer.
 5. Dimensional Stability: 2 percent maximum linear change when conditioned at 158 degrees F and 97 percent relative humidity for seven (7) days.
 6. Board Size: Factory formed board units.
 - a. Maximum, 4 x 8 feet for mechanical attachment.
 - b. Maximum, 4 x 4 feet for adhered attachment.
 - c. Field cutting of larger boards is not acceptable.
 7. Board Thickness: Total thickness and thermal resistance requirements to be as indicated on Drawings. Thickness to meet the minimum R value required per the NC Energy Conservation Code.
 - a. Layers: Applied in not less than two (2) layers, with staggered and sealed joints.
 - b. Parapet Walls: Thickness above roof level at interior face of parapet walls to be 1 inch, unless indicated otherwise on Drawings.
 8. Board Edges:
 - a. Square.
 9. Tapered Board: Slope as indicated on Drawings, but not less than 1/4 inch per foot; minimum thickness of 1/2 inch.
 - a. Slope for Crickets and Saddles: 1/2 inch per foot.
 10. Manufacturers:
 - a. Atlas Roofing Corporation.
 - b. Johns Manville.
 - c. Rmax, Incorporated.
 - d. Versico Roofing Systems.
 - e. Substitutions: Section 01 60 00 - Product Requirements.
- D. Tapered Edge Strip:
1. For use with polyisocyanurate insulation boards.
 - a. Closed-cell polyisocyanurate foam core integrally bonded to non-asphaltic, fiber-reinforced organic felt or inorganic coated-glass facers. Product to be dimensionally stable providing a "zero edge" slope transition at crickets, drain sumps, and other sloped drainage transitions. Edge strips to be 2 by 24 inches (1 inch per foot slope).

- b. Basis of Design: Atlas - Gemini Tapered Edge Strip (TES).
- E. Cover Boards: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 500 psi moisture resistant treated core, non-asphaltic primer surfacing, and tested in accordance with ASTM E84 and ASTM E136.
 - 1. Board Size: Factory formed board units.
 - a. 5/8 inch thick and 4 x 8 feet size.
 - 2. Manufacturers:
 - a. Georgia Pacific: DensDeck Prime Roof Board.
 - b. National Gypsum Company: DEXcell FA (coated) Glass Mat Roof Board.
 - c. USG Corporation: Securock Coated Glass-Mat Roof Board.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
 - 3. Basis of Design: Georgia Pacific - DensDeck Prime Roof Board.

2.3 ACCESSORIES

- A. Sound Absorbing Insulation Strips: Refer to Section 05 31 00 - Steel Decking for metal decking with acoustic flutes that provide for sound absorbing insulation strips to be installed in all deck flutes. Sound absorbing insulation strips are to be pre-formed, continuous length and full depth of each flute, and to be as recommended by the metal decking manufacturer.
- B. Primer Materials: For component materials requiring substrate to be primed, use primer recommended by both the substrate manufacturer and the manufacturer of the component requiring the primer.
- C. Sheathing Joint Tape: Minimum 5 inches wide, high temperature and self-adhering type, compatible with subsequent layer material, and as recommended by sheathing manufacturer.
- D. Insulation Joint Tape: Minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer.
- E. Attachment Materials: Approved by manufacturer of material to be fastened or adhered to installed substrate.
 - 1. Mechanical Fasteners: For attachment of material to installed metal decking.
 - a. Corrosion resistant 3 inch galvalume stress plate and corrosion resistant screw type fasteners.
 - b. Length, diameter, and configuration to be as required by material type, thickness, and size. Length to provide for penetration through metal deck material by minimum of 3/4 inch and maximum of 1 inch.
 - 2. Adhesives: Foamed and fluid applied adhesives to be a one or two part, VOC compliant, moisture-cured polyurethane type.

PART 3 EXECUTION

3.1 GENERAL

- A. The following execution requirements are minimum requirements. Where manufacturer's requirements are more stringent, follow the manufacturer's more stringent requirements.
- B. Install all roofing system components in accordance with the design for wind load resistance, Contract Documents, manufacturers' recommendations, applicable code requirements, and in accordance with the recommendations of the entity providing roofing system warranty.
- C. Use equipment and tools recommended by component's manufacturer.

3.2 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Inspect substrate for soundness and compliance with project requirements and recommendations of roofing system materials manufacturers.
- C. Commencement of work signifies Contractor's acceptance of substrate. Any defects in roofing work resulting from such accepted substrates shall be corrected to Owner's satisfaction at no additional expense.

3.3 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section. Prepare materials to be installed and equipment used during installation.
- B. Roof deck to be dry and broom cleaned of debris and foreign matter.
- C. Metal Decks with Acoustic Flutes:
 - 1. Install preformed sound absorbing insulation strips at full depth and continuous in flutes, and in accordance with manufacturer's instructions.
- D. Concrete Decks:
 - 1. Verify adjacent precast concrete roof members do not vary more than 1/4 inch (6 mm) in height. Verify grout keys are filled flush.
 - 2. Fill surface honeycomb and variations with filler recommended by deck manufacturer and as compatible with subsequent component material application.
 - 3. Do not begin work until concrete substrate has cured at least 28 days and moisture content is 5 percent or less.
 - a. Test as Follows:
 - 1) Concrete Moisture Content: No beading water under plastic after 16 hours when tested in accordance with ASTM D4263.
 - 2) Relative Humidity in Concrete: Not greater than 75 percent when tested in accordance with ASTM F2170.
 - 3) Other tests as recommended by manufacturers of application materials.
 - 4) Where manufacturer's requirements are more stringent, comply with manufacturer's more stringent requirements.

3.4 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Primer Materials: Apply primers, when required, in accordance with recommendations of primer manufacturer, the substrate manufacturer and the manufacturer of the component requiring a primer.
 - 1. Substrate is to be clean, dry, and free of dust, grease, and other contaminants. Shake container well before application. Apply to surfaces using manufacturer recommended equipment and coverage requirement.
 - 2. Comply with both primer manufacturer's time requirements, after primer application, for subsequent application of component material over primed substrate.
- C. Sheathing Board: Install and attach sheathing board at roof locations and as indicated on Drawings.
 - 1. Lay boards with staggered end joints.
 - a. For metal decks, lay boards with long side at right angle to flutes and deck support at ends of boards.

2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
 3. Seal joints continuous with joint tape.
- D. Vapor Retarder: Install and attach vapor retarder at roof locations and as indicated on Drawings.
1. Comply with manufacturer's recommendations for site conditions regarding application temperature, moisture, and humidity ranges.
 2. Substrate shall be clean, dry, and free of dust, grease, and other contaminants.
 3. Apply primer to substrate if vapor retarder manufacturer requires primer for specific substrate. Use manufacturer recommended equipment and coverage requirement.
 4. Begin vapor retarder sheet application at the bottom of the slope. Unroll vapor retarder onto the substrate without adhering for alignment. Overlap end and side joints, and stagger end joints of subsequent sheet rows in accordance with manufacturer recommendations, but not less than the following:
 - a. Overlap each preceding sheet lengthwise and at ends, and stagger end laps by at least 12 inches.
 - b. Overlap each preceding sheet by not less than 3 inches lengthwise and not less than 6 inches at ends. Stagger end laps by at least 12 inches.
 5. Extend vapor retarder under cant strips (if any) and blocking to deck edge.
 6. Install flexible flashing from vapor retarder to air seal material of wall construction; lap and seal to provide continuity of the air barrier plane.
- E. Fill and Tapered Insulation:
1. Comply with the requirements of this Section, the Drawings, and the instructions of the manufacturers of the insulation materials and roofing membrane.
 2. Apply only as much insulation materials as can be covered watertight by the roofing membrane on the same day.
 3. On steel decks, apply board materials with long dimension of units across deck ribs. Ends of board materials must be bearing on upper flute surface of steel deck for continuous end support.
 4. On concrete decks, prime concrete decks prior to attachment with a uniform coating of primer per manufacturer's standard application rates.
 5. Insulation materials to be in full sheets, carefully fitted and pushed together for tight joints. Gaps exceeding 1/4 inch are not acceptable.
 6. Insulation materials that must be cut to fit are to be saw-cut or knife-cut in a straight line, not broken. Chalk lines to be used to cut insulation. Uneven or broken edges are not acceptable. Insulation shall be field trimmed to fit tightly to roof obstructions and terminations. Remove dust and debris from roof area that develops during cutting operations.
 7. Stagger joints of each additional layer of board materials by 12 inches each way to ensure that joints do not coincide with joints of preceding layers.
 8. All joints to be fully taped and sealed with minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer.
 9. Crickets, saddles, and tapered edge strips shall be installed before the cover board material.
 10. At roof edges, install insulation system, nailers and other roof construction in a manner as to produce a flush and smooth transition for roof membrane and flashing.
 11. Install insulation, tapered insulation and tapered edge strips as required to accommodate roof and flashing conditions, prevent water dams and ponding water. Ponding water at scuppers and cricket valleys is not acceptable.

12. Provide necessary modifications to prevent standing water which is defined as 1/4 inch of water or more, in an area that is 4 sf or larger, at 24 hours or more after precipitation.
 13. Tapered Insulation:
 - a. Install tapered insulation system to achieve elevations, thicknesses and slopes indicated on Drawings and to provide positive slope for complete roof drainage.
 - b. Crickets shall be sized as shown in the Drawings. Modifications shall be provided to ensure positive slope and prevent standing water along cricket valleys and at drain sumps.
 - 1) Minimum length to width ratio shall be 2:1. Fabricate partial crickets with dimensions which would result in a minimum length to width ratio of 2:1 if they were extended to full size.
 - 2) Unless otherwise noted, fabricate all crickets from tapered stock as required to provide the specified minimum slope. For example, when roof slope is indicated as 1/4 inch per foot minimum, fabricate crickets with slope of 1/2 inch per foot minimum.
 - 3) Construct crickets on up slope side of all curbs to ensure positive drainage.
 - 4) Install tapered edge strips at cricket edges and drain sumps to provide a smooth transition to cricket valley or roof drain construction.
 - c. Insulation boards may require mechanical fasteners and stress plates at slope transitions to minimize bridging.
- F. Roof Drainage:
1. Drainage sumps shall be installed as indicated on Drawings.
 2. Carefully lay out and install tapered insulation, sumps, drain bowls and scuppers to ensure the finished roof provides complete drainage with no standing water.
 3. Fabricate sumps to provide smooth transitions between the insulation system and the drains/scuppers.
 4. Sumps shall ensure complete roof drainage and prevent water dams.
 5. Adjust insulation, drains and scuppers to ensure complete roof drainage and satisfactory substrates for membrane and flashings.
 6. Drain sump components shall be fastened to the deck using specified insulation fasteners or adhesives.
 7. Circular sumps and sumps that do not provide smooth transition or that create standing water at the drains shall be rejected and shall require removal and replacement.
- G. Mechanical Attachment:
1. Mechanical fasteners and materials being fastened shall be installed in accordance with manufacturer's recommendations and in locations, quantities, and spacing as required to withstand Wind Design requirements indicated in this Section in PERFORMANCE REQUIREMENTS article.
 2. Fasteners shall be installed using manufacturer's recommended equipment and in accordance with the manufacturer's requirements.
 3. Fasteners and stress plates shall be set secure and tight against the insulation surface and shall not be over-driven.
 4. Fasteners shall engage the top flange of steel deck.
 5. Coordinate to avoid damage to other construction components below decking (e.g., electrical conduits, box, etc.).
- H. Adhesive Attachment:
1. Adhesive and materials being adhered shall be installed in accordance with manufacturer's recommendations as required to withstand Wind Design requirements indicated in this Section in PERFORMANCE REQUIREMENTS article.

2. Component to be adhered is to be placed in full contact with adhesive and weighted into place.
3. Ensure full adhesion of materials and provide appropriate equipment and methods necessary to achieve full adhesion, including, but not limited to, temporary ballasting until adhesive sets.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed work from damage and moisture.

END OF SECTION

SECTION 07 27 00**AIR BARRIERS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Air Barriers.
- B. Related Requirements:
 - 1. Division 07 - Thermal and Moisture Protection: Exterior cladding systems.
 - 2. Section 07 21 19 - Foamed-In-Place Insulation.
 - 3. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with air barriers.
 - 4. Section 09 21 16 - Gypsum Board Assemblies: Exterior gypsum board sheathing.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
 - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 3. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission of Materials; 2022a, Editorial Revisions 2023.
 - 4. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination, scheduling, and sequencing.
- B. Coordinate the work of this Section with other adjacent and interfacing work.
- C. Coordinate compatibility of materials provided for the work of this Section with insulation and other materials provided under other Sections of work.
- D. Sequence the work to permit installation of materials in conjunction with related materials and seals.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures.
- B. Product Data: Submit data on material characteristics, performance criteria, and limitations.
- C. Compatibility Certification: Include manufacturer's certification that the materials provided are compatible with the insulation materials with which the manufacturer's materials contact.

- D. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.

1.5 QUALITY ASSURANCE

- A. Air Barrier Association of America (ABAA) Evaluated Air Barrier Assemblies: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacturing, and use secondary materials approved in writing by primary material manufacturer.
- B. Manufacturer Qualifications: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacturing, and use secondary materials approved in writing by primary material manufacturer.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum three (3) years documented experience.

1.6 MOCK-UPS

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
 - 1. Install and incorporate requirements of this Section into mock-ups required for construction for the project.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Maintain temperature and humidity recommended by materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Air Barrier System: Continuous network of materials and joints providing air tightness, with adequate strength and stiffness to not deflect excessively under air pressure differences, to which it will be subjected in service. It can be comprised of single material or combination of materials to achieve performance requirements.
- B. Provide continuity of air barrier materials and assemblies in conjunction with other barrier materials described in Division 07 - Thermal and Moisture Protection.
- C. Static Test: Resist air leakage caused by static air pressure across exterior wall assemblies and other interruptions to integrity of building enclosure systems; to maximum air leakage rate of 0.004 cfm/sq ft when subjected to pressure differential of 1.57 lbs/sq ft when tested in accordance with ASTM E2178.

2.2 AIR BARRIER MATERIALS

- A. Air Impermeable and Water Vapor Impermeable:
 - 1. Self-adhered sheet of rubberized asphalt bonded to thermoplastic sheet complying with ASTM D1970/D1970M.
 - 2. Thickness: 40 mils (0.040 inch), minimum.

3. Sheet Width: 6 inches, 12 inches, 18 inches, 24 inches, and 36 inches; coordinate width with application area.
4. Air Permeance: 0.004 cfm/sq ft (0.02 L/s/sq m), maximum; ASTM E2178 with pressure differential of 1.57 lb./sq ft.
5. Water Vapor Permeance: 0.10 perm, maximum; ASTM E96/E96M using Procedure A (desiccant method) at 73.4 degrees F.
6. Water Penetration Resistance Around Nails: Pass; ASTM D1970/D1970M (modified).
7. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for minimum of 50 days weather exposure.
8. Comply with NFPA 285 requirements for wall assembly.
9. Seam and Perimeter Tape: As recommended by sheet manufacturer.
10. Manufacturers:
 - a. Carlisle Coatings and Waterproofing, Inc.
 - b. Henry Company.
 - c. W.R. Meadows, Inc.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
11. Basis of Design:
 - a. Henry Company - Blueskin SA.

2.3 ACCESSORIES

- A. Substrate Cleaner: Non-corrosive; type recommended by barrier product manufacturer; compatible with adjacent materials.
- B. Primers and Adhesive: As recommended by barrier product manufacturer for substrate material.
- C. Sealant: Moisture cure type as recommended by barrier product manufacture for construction joints subject to dynamic joint movement.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that surfaces and conditions are ready to accept the work of this section. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section. Prepare materials to be installed and equipment used during installation.
- B. Remove loose or foreign matter that may otherwise impair adhesion of materials.
- C. Clean and prime substrate surfaces to receive barrier materials if recommended by barrier material manufacturer.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the Work in accordance with manufacturer's recommendations and as indicated on Drawings.

- C. Air Barriers: Install continuous airtight barrier over solid surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Apply sealants and adhesives at locations recommended by barrier manufacturer. Apply within temperature range as recommended by manufacturer.
- E. 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 airtight.
 - 3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that all material and laps are firmly adhered to substrate with no gaps or fish mouths.
 - 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.
- F. Openings, Junctions, and Penetrations in Air Barriers:
 - 1. Sheet Seal at Wall/Roof Junction: Lap sheet seal onto roof air barrier material and seal. Caulk to ensure complete air seal. Position lap seal over firm bearing.
 - 2. Install sheet seal between window and door frames and adjacent wall seal materials with air barrier material. Apply sealant to ensure complete seal. Position lap seal over firm bearing.
 - 3. Install sheet seal to maintain continuity across different substrates and interface with other construction and building assemblies.
 - 4. Provide 2 inches minimum overlap of spray foam insulation over sheet seal membrane edges.
 - 5. Provide 2 inches minimum overlap at sheet seal joint and apply in manner as to shed water.
 - 6. Construct all end dams at sill installations to provide continuous air barrier with window openings.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not leave materials exposed to weather longer than recommended by manufacturer.
- C. Do not permit adjacent work to damage work of this section.

END OF SECTION

SECTION 07 41 13
METAL ROOF PANELS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal roofing system.
 - 2. Roof insulation.
 - 3. Underlayment sheet.
 - 4. Roofing system accessories.
 - 5. Metal flashings and trim.
- B. Related Sections:
 - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
 - 2. Section 07 42 13 - Metal Wall Panels.
 - 3. Section 07 62 00 - Sheet Metal Flashing and Trim.
 - 4. Section 07 71 23 - Manufactured Gutters and Downspouts.
 - 5. Section 07 90 00 - Joint Protection.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
 - 2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
 - 1. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.
 - 2. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board; 2020.
 - 3. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
 - 4. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
 - 5. ASTM C1306/C1306M - Standard Test Method for Hydrostatic Pressure Resistance of a Liquid-Applied Waterproofing Membrane; 2016, Reapproval 2023.
 - 6. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
 - 7. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2023.
 - 8. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2023.
 - 9. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

10. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
 11. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2020a.
 12. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005, Reapproval 2017.
 13. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995, Reapproval 2018.
 14. ASTM E1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 2016, Reapproval 2022.
- D. National Roofing Contractors Association (NRCA):
1. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; Fifth Edition, With Interim Updates.
- E. National Standard of Canada (CAN) / ULC Standards (ULC):
1. CAN/ULC-S770 - Standard Test Method For Determination Of Long-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams; Reaffirmed 2020.
- F. Sheet Metal and Air Conditioning Contractors (SMACNA):
1. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.
- G. Underwriters Laboratories Inc. (UL):
1. UL 580 - Standard for Safety Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including all Updates.
 2. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings; Current Edition, Including all Updates.

1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
 1. Submit data on roofing system, components, and accessories. Include data regarding metal types, finishes, and characteristics.
- C. Shop Drawings:
 1. Indicate metal roofing panel and trim profiles, jointing patterns, jointing details, fastening methods, flashings, terminations, snow guards and installation details.
 2. Engineered Design Data: Submit structural design calculations for metal roofing signed and sealed by professional engineer.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit instructions including special procedures for roofing penetrations, flashings, and perimeter conditions requiring special attention.

- G. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA (ASMM), and NRCA ML104, and the manufacturer's instructions.
- B. Field Quality Control:
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing. Representative is to not be in the employment of the roofing Installer.
 - 2. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.
 - 3. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience and approved by manufacturer.
- C. Engineered Design: Design sheet metal roofing system under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State in which the Work is constructed.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Provide strippable plastic protection on prefinished roofing panels for removal after installation.
- C. Store roofing panels on project site as recommended by manufacturer. Provide proper ventilation and prevent twisting, bending, abrasion, and other damage to panels.
- D. Prevent contact with materials causing discoloration or staining.

1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Requirements for warranties.
- B. Provide two (2) year General Contractor's material and labor warranty to cover failure to prevent penetration of water.
- C. Special Warranties:
 - 1. Special Watertightness Warranty: Manufacturer's warranty in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain watertight, including leaks, within specified warranty period.
 - a. Warranty Form:
 - 1) No Dollar Limit Form.
 - b. Warranty Period: Duration from date of Substantial Completion.
 - 1) Twenty (20) Years.
 - c. The addition of solar panels mounted with mounting clamps to roof panel standing seams shall not void the warranty.

- d. Shop drawings must be provided (or reviewed) by the panel manufacturer and approved by the panel manufacturer prior to the installation of the panel system.
 - e. A minimum of two inspections by the technical representative of the panel system manufacturer are required. The first inspection is to be performed when the underlayment and flashing are in place and the second inspection is to be performed when the roof is complete.
2. Special Installer Warranty: Furnish a written warranty signed by the roofing panel installer, guaranteeing materials and workmanship for watertightness of the roofing system, flashings, penetrations, and against all leaks within specified warranty period.
 - a. Warranty Period: Two (2) years from date of Substantial Completion.
 3. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - a. Warranty Period: twenty (20) years from date of Substantial Completion.
 - b. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - 1) Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - 2) Chalking more than a No. 8 rating when tested according to ASTM D4214.
 - 3) Cracking, chipping, peeling, or failure of paint to adhere to bare metal.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Design and provide complete roofing system, including roof panels, clips, fasteners, connectors, insulation, flashings, and accessories, tested for compliance with the following minimum standards.
- B. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
- C. Wind Loads: Design and size components to withstand positive and negative wind loads, including increased loads at building corners.
 1. Design Wind Load: As calculated in accordance with ASCE 7 with 100 mph basic wind speed, exposure C.
- D. Wind Uplift Resistance: Class 90 wind uplift resistance of UL 580.
- E. Air Infiltration: Limit air leakage through roof assembly to 0.025 cfm/sq ft of roof area, measured at reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E1680.
- F. Water Leakage: None, when measured in accordance with ASTM E1646 with test pressure of 6.24 psf. Perform test immediately following air infiltration test.
- G. Roof Covering Fire Test Classification: UL 790 (ASTM E108), Class A, minimum.
- H. Exterior Components: Accommodate the following without damage to system, components, or deterioration of seals.
 1. Movement within system.
 2. Movement between system and perimeter framing components.
 3. Dynamic loading and release of loads.
 4. Deflection of structural support framing.

5. Expansion and contraction from temperature range of 170 degrees F over 12 hour period.

2.2 MANUFACTURED SHEET METAL ROOFING

- A. Manufacturers:
 1. ATAS International, Inc.
 2. Berridge Manufacturing Company.
 3. Centria Architectural Systems.
 4. Construction Metal Products (CMP).
 5. Dimensional Metals, Inc. (DMI).
 6. Fabral Metal Wall and Roof Systems.
 7. Innovative Metals Company, Inc. (IMETCO).
 8. MCB I Metal Wall and Roof Systems.
 9. McElroy Metal, Inc.
 10. Metal Roofing Systems, Inc.
 11. Metal Sales Manufacturing, LLC.
 12. Petersen Aluminum Corporation (PAC-CLAD).
 13. Substitutions: Section 01 60 00 - Product Requirements.
- B. Structural Metal Roof Panels: Provide complete engineered system designed and constructed to complying with specified requirements, remain weathertight, withstand anticipated movement of substrate and thermally induced movement of roofing system.
- C. Metal Panels and Components: Factory-formed metal panels and components with factory-applied finish.
 1. Base Sheet Metal:
 - a. Steel Panels:
 - 1) SS (structural steel), Grade 50 sheet.
 - 2) Galvalume Coating: Aluminum-zinc alloy-coated complying with ASTM A792/A792M; minimum AZ50 (AZM150) coating.
 - 3) Steel Thickness: Minimum 24 gauge, 0.024 inch (0.61 mm), unless indicated otherwise on Drawings.
 2. /Roof Panel Type: Single skin, uninsulated.
 3. Roof Panel Profile: Standing seam, with 2.0 inch (51 mm) seam height; concealed fastener system for field seaming.
 - a. Seam Type: 180 degrees double locked, field machine formed seams.
 4. Roof Panel Texture:
 - a. Smooth, and striated for added stiffness.
 5. Roof Panel Length:
 - a. As indicated on Drawings.
 6. Roof Panel Width: Nominal 16 inches, unless indicated otherwise on Drawings.
 - D. Metal Finish: Factory applied.
 1. Exposed Finish:
 - a. Polyvinylidene fluoride (PVDF) multi-coat organic coatings system including at least 70 percent PVDF resin and having a minimum total dry film thickness (TDFT) of 1.2 mil (0.0012 inch) (0.030 mm) when measured in accordance with ASTM D1790.
 - b. AAMA Coating System Compliance Required:
 - 1) AAMA 2605 - Superior performing organic coating system.
 - 2) Coating Manufacturers:
 - a) Arkema, Inc.: Kynar 500.
 - b) PPG Metal Coatings: Duranar.
 - c) Sherwin-Williams Company: Fluoropon.

2. Unexposed Finish: Manufacturer's standard coating, minimum 0.5 mil total dry film thickness.
3. Color and Gloss:
 - a. As selected by Architect from panel manufacturer's full range.

2.3 INSULATION MATERIALS

- A. Polyisocyanurate (ISO) Insulation Board: Rigid closed-cell foam panels, complying with ASTM C1289.
 1. Basis of Design: Johns Manville - Energy 3.
 2. Type II:
 - a. Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
 - 1) Compressive Strength:
 - a) Grade 2: 20 psi (138 kPa), minimum.
 - 2) : : Long Term Thermal Resistance at 1.5 Inch Thick: 8.4 (1.48) LTTR, minimum when tested at 75 degrees F (24 degrees C) in accordance with ASTM C1306/C1306M or CAN/ULC-S770.
 3. Flame Spread Index (FSI): Class B - 26 to 75; per ASTM E84.
 4. Smoke Developed Index (SDI): 450 or less; per ASTM E84.
 5. Tensile Strength: 500 psf, minimum per ASTM C209.
 6. Water Absorption: 1 percent, maximum by volume per ASTM C209.
 7. Water Vapor Permeance: 1 perm, maximum per ASTM E96.
 8. Board Size: Largest size applicable, but not less than 48 x 96 inches.
 9. Board Thickness: As indicated on Drawings and as required to meet the minimum R value required per the NC Energy Conservation Code.
 10. Number of Layers: As indicated on Drawings and as required to meet the minimum R value required per the NC Energy Conservation Code.
 11. Board Edges: Square.
- B. Underlayment Sheet: Self-adhering with reinforcing scrim, high temperature sheet, consisting of slip-resisting top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.
 1. Thickness: 50 mils (0.05 inch), minimum.
 2. Roll Width: 36 inches.
 3. Thermal Stability: Stable after testing at 250 deg F; ASTM D1970/D1970M.
 4. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970/D1970M.
 5. Seams shall be lapped in accordance with manufacturer's recommendations.
 6. Underlayment shall be approved for 90 days (minimum) of exposure to UV and weather penetrations.
- C. Slip Sheet: Rosin building paper.

2.4 ACCESSORIES

- A. Miscellaneous Sheet Metal Items: Unless indicated otherwise on Drawings, provide metal roofing related flashings, trim, moldings, closure strips, preformed crickets, caps, equipment curb flashings, and similar sheet metal items of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be stainless steel material.
 1. Coordinate work requirements with requirements in the following Sections:
 - a. Section 07 62 00 - Sheet Metal Flashing and Trim.
 - b. Section 07 71 23 - Manufactured Gutters and Downspouts.

- B. Rib and Ridge Closures: Provide prefabricated, close-fitting, and weathertight components of same metal, thickness, and finish as roof panels.
- C. Fasteners: Stainless steel.
- D. Insulation Board Joint Tape: Minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer.
- E. Sound Absorbing Insulation Strips: Application is to provide sound absorbing material within acoustic flutes of all acoustic metal roof decking. Sound absorbing insulation strips are to be pre-formed, continuous length and full depth of each flute, and to be as recommended by the metal decking manufacturer.
- F. Sealant:
 - 1. Seam Sealant: Factory applied continuous non-curing butyl sealant.
 - 2. Exposed Sealant: Silicone type approved by component manufacturer.
- G. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action by applying a permanent separator material. Separator material to be type that will remain in the concealed area of application without running, staining, or migrating onto visible finish surfaces. Separator material must be acceptable to building component manufacturer and may include material such as a zinc molybdate alkyd coating, or a bituminous coating, or self-adhering rubberized asphalt sheet, or other permanent applied material as recommended by component manufacturer.
- H. Snow Guards: Prefabricated, noncorrosive units designed to be installed without penetrating metal roof panels, and complete with predrilled holes, clamps, or hooks for anchoring. Snow guards shall be illustrated within the panel manufacturer's shop drawings and shall be designed to resist the sliding force of snow in accordance with the requirements of ASCE-7. Confirming calculations to be provided by the roofing panel manufacturer as part of the shop drawings submittal.
 - 1. Seam-Mounted, Bar-Type Snow Guards: Extruded Aluminum rods or bars held in place by aluminum clamps attached to vertical ribs of standing-seam metal roof panels.
 - 2. Color:
 - a. Match roof panels in finish type and color.

2.5 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Form sections accurate in size, square, and free from distortion or defects.
 - 1. Form roofing panels to width indicated.
 - 2. Finished standing seam height to be 2 inches after on-site machine forming of 180 degrees Double-Lock seam.
 - a. Seam Sealant: Factory applied continuous non-curing butyl sealant.
 - 3. Length of roofing panels to be continuous from eaves to ridges.
- C. Fabricate fascia, trim, flashing, and other metal components from same material as metal roof panels.
 - 1. Provide exposed metal surfaces with same finish as exposed face of metal roof panels.
- D. Fabricate cleats of same material as sheet, to interlock with sheet.
- E. Fabricate starter strips of same material as sheet, continuous, to interlock with sheet.
- F. Form pieces in longest practical lengths, but not less than specified lengths where indicated.
- G. Hem exposed edges on underside 1/2 inch; miter and seam corners.

- H. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- I. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- J. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Metal Deck:
 - 1. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to eaves.
 - 2. Verify deck is dry and free of snow and ice. Verify substrate joints are solidly supported and fastened.
 - 3. Verify wood nailers are installed and correctly located.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- D. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Verify that manufacturer applied factory applied continuous sealant in roofing panel seams and as may be required for other roofing system components.
- D. Metal Decks with Acoustic Flutes:
 - 1. Install preformed sound absorbing insulation strips at full depth and continuous in flutes, and in accordance with manufacturer's instructions.
- E. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action with permanent applied material as indicated in ACCESSORIES article in this Section. Where using applied coating, coat to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Overall:
 - 1. Install roofing system in accordance with the Contract Documents, Engineer's design, and panel manufacturer's instructions and recommendations. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
 - 2. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
 - 3. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.

4. Install all components and accessories required for a complete roofing assembly, including, but not limited to, flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
 - a. Coordinate work requirements with other related Section of work such as sheet metal flashing and trim, roofing specialties, roof hatches, gutters, downspouts, roof deck substrates, etc.
- C. Insulation:
1. Apply no more insulation than can be covered with roofing and made weathertight in same day.
 2. Place boards perpendicular to deck flutes with edges over flute surface for bearing support.
 3. Lay boards with edges in contact, but without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
 4. Mechanically fasten insulation to deck.
 5. Stagger joints for each additional layer of board materials by 12 inches each way to ensure that joints do not coincide with joints of preceding layers.
 6. Fully tape all joints of each insulation layer with minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer.
 7. Total insulation thickness shall be as indicated on Drawings.
 8. Place fasteners in accordance with wind uplift requirements, but not less than one fastener for every two square feet of insulation board area.
- D. Underlayment Sheet:
1. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer and as indicated herein. Comply with temperature restrictions of underlayment manufacturer for installation and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 90 days.
 2. Apply underlayment over entire roof surface, wrinkle free, in shingle fashion to shed water.
 3. Lower edge terminations and roof edge terminations to be as indicated on Drawings.
 4. Install underlayment laid perpendicular to slope.
 5. Weather lap side edges not less than 3-1/2 inches.
 6. Weather lap end laps not less than 6 inches and staggered 24 inches between courses.
 7. Turn up 4 inches onto roof penetrations and other vertical obstructions.
- E. Metal Roofing Panels:
1. Install slip sheet over underlayment prior to installing roofing panels.
 2. Install roofing panels with long dimension perpendicular to eaves.
 3. Install roofing panels beginning at eaves. Panel to extend from eaves to ridges without traverse joints.
 4. Install clips to secure roof panels without deforming roof panels.
 - a. Where indicated on Drawings, install clips spaced 24 inches o.c. maximum to receive future solar panels. The addition of solar panels using solar panel hardware clamps shall not void the roofing warranty.
 5. Machine form standing seam, forming a 180 degrees Double Lock seam, between adjacent roofing panels. Hand form joints where machine forming is not possible.
 6. Terminate roofing panels with sheet metal trim and flashing for watertight installation. Close and conceal openings between roofing panels, panel seams, and roof substrate.
 7. Seal metal joints watertight.
 8. Install snow guards in locations indicated on Drawings and in accordance with roofing panel manufacturer's written recommendations.

- F. Flashing and Trim:
1. Place eave edge and rake edge metal flashings tight to fascia. Weather lap joints 2 inches and seal with plastic cement. Secure flange to substrate.
 2. Form valleys with sheet metal not exceeding 10 feet in length. Lap joints 6 inches in direction of drainage. Extend valley sheet minimum 6 inches under roofing sheets.
 3. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
 4. Secure flashing exposed edges with continuous cleats.
 5. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
 6. Seal metal joints watertight.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit traffic over unprotected roof surface.

END OF SECTION

SECTION 07 42 13
METAL WALL PANELS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Manufactured preformed metal wall panels and framing support system.
- B. Related Sections:
 - 1. Section 07 43 13 - Metal Soffit Panels.
 - 2. Section 07 62 00 - Sheet Metal Flashing and Trim.
 - 3. Section 07 90 00 - Joint Protection.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Current Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
 - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
 - 2. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.
 - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 - 4. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
 - 5. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
 - 6. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2023.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on panels and hanging system; include metal types, finishes, and characteristics.
- C. Design Data: Submit design calculations.
- D. Shop Drawings: Indicate dimensions, layout, joints, expansion joints, construction details, panel profiles, methods of anchorage, and interface with adjacent materials.

- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- G. Manufacturer's Installation Instructions: Submit special procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five (5) years of documented experience.
- B. Installer Qualifications: Company specializing in installing the products specified in this section with minimum five (5) years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.
- D. Prevent contact with materials that may cause discoloration or staining of products.

1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures.
- B. Furnish twenty (20) year manufacturer warranty to cover degradation of panel finish, including color fading caused by exposure to weather.
- C. Furnish five (5) year installer warranty to cover defects in water tightness and integrity of seals.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design and size system components and support system to support wall panel system dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to wall plane.
 - 1. Wind Design Pressure:
 - a. As indicated on Drawings, in accordance with ASCE 7, and in accordance with the State Building Code for the State in which the project is located.
 - 2. Maximum Allowable Deflection of Panel: 1/180 of span.
- B. Air Leakage: 0.01 cfm/sf, maximum with static pressure differentials of 6.24 psf, in accordance with ASTM E283/E283M.
- C. Water Penetration: None with static pressure differentials of 12.00 psf, with water spray of 5 gal/hr/sf, for 15 minutes, in accordance with ASTM E331.

- D. Thermal Movement: Allow for thermal movement from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.

2.2 METAL WALL PANELS

- A. Manufacturers:
1. AEP-Span.
 2. ATAS International, Inc.
 3. Berridge Manufacturing Company.
 4. Centria.
 5. Dimensional Metal, Inc. (DMI).
 6. Fabral.
 7. McElroy Metal, Inc.
 8. Metal Roofing Systems, Inc.
 9. Petersen Aluminum Corporation (PAC).
- B. Basis of Design:
1. Centria - IW Series, IW-14A.

2.3 COMPONENTS

- A. Precoated Metal Sheet:
1. Precoated Aluminum Sheet:
 - a. Comply with the following:
 - 1) ASTM B209/B209M, aluminum alloy and temper to be as required for structural performance requirements.
 - b. Thickness:
 - 1) 18 gauge (0.040 inch) (1.02 mm) thick minimum.
 - c. Continuous coil-coated on exposed surfaces with specified finish coating and on concealed surfaces with specified concealed surfaces coating.
 2. Strippable Film: Apply to the exposed surface of finished coil to protect the finish during fabrication, shipping, and field handling. Strippable film to be removed as recommended by manufacturer.
- B. Exterior Metal Panels: Factory formed.
1. Installation Direction:
 - a. As indicated on Drawings.
 2. Panel Width:
 - a. 12 inches, unless indicated otherwise on Drawings.
 3. Profiles:
 - a. Flush with single V groove for stiffening.
 4. Panel Depth:
 - a. 1-1/2 inch depth.
 5. Panel Edges: Concealed fastened and continuous interlocking edge.
 - a. Sealed with continuous sealant bead.
 6. Color: As selected by Architect from manufacturer's full range of colors.
- C. Movement and Expansion Joints: Same material, thickness and finish as metal panel and concealed fasteners. Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
- D. Provide continuity of air barrier and vapor retarder seal at building enclosure elements.

- E. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
- F. Internal and External Corners: Same material, thickness, and finish as metal panels; profile to suit system; shop cut and factory mitered to required angles; profile as indicated on Drawings, but not less than 3 inch returns.
- G. Trim, Closures, Caps, Flashings, Facias and Infills: Same material, thickness, and finish as metal panels; brake formed to required profiles.
- H. Fasteners to be concealed; self-tapping screws and other acceptable fasteners recommended by panel manufacturer; non-corrosion type compatible with materials being fastened and substrate. Where exposed fasteners are required for special trim conditions, fastener heads to be factory finished to match the finish of the adjacent material finish.
- I. Metal Framing Support System: Cold-formed metallic-coated steel sheet, ASTM A653/A653M, G90 (Z180).
 - 1. Metal thickness as indicated on Drawings, but not less than 0.06 inch/16 ga.
 - 2. Anchorage to be concealed, non-corrosive type and as required to comply with structural performance requirements, including specified deflection limitations; hat channel profile; appropriate to anchor panel system to building structure.

2.4 FABRICATION

- A. Form sections to shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.

2.5 FACTORY APPLIED FINISH

- A. Exposed Surface Finish:
 - 1. AAMA 2605: Fluoropolymer coil coating system. Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil (0.0009 inch) (0.023 mm). Color and gloss as selected by Architect from manufacturer's full range.
- B. Concealed Surface Finish: Manufacturer's standard coating, minimum 0.5 mil dry film thickness; compatible with finish system, as recommended by finish system manufacturer.

2.6 ACCESSORIES

- A. Underlayment Sheet: As indicated on Drawings; compatible with panel system manufacturer's panels and requirements; designed for exterior application.
- B. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.
- C. Sealants to be as required by manufacturers of materials being sealed and may include:
 - 1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane as required by manufacturers of materials being sealed.
 - 2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
 - 3. Seam Sealant: Factory-applied, non-skinning, non-drying type.
- D. Field Touch-up Paint: As recommended by panel manufacturer.
- E. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action by applying a permanent separator material. Separator material to be type that will remain in the concealed area of application without running, staining, or migrating

onto visible finish surfaces. Separator material must be acceptable to building component manufacturer and may include material such as a zinc molybdate alkyd coating, or a bituminous coating, or self-adhering rubberized asphalt sheet, or other permanent applied material as recommended by component manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that building framing members or structural concrete or masonry walls are ready to receive panels.
- C. Verify that weather and air barriers and thermal insulation has been installed completely and correctly.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Install Underlayment:
 - 1. Install underlayment as indicated on Drawings.
 - 2. Weather lap edges 2 inches minimum and ends 6 inches minimum.
 - 3. Stagger vertical joints of each layer.
 - 4. Fasten securely to substrate with stainless steel fasteners.
- D. Install subgirts and support framing system as indicated on Drawings and as required by panel manufacturer for conditions and direction of panels. Securely fasten with stainless steel fasteners to substrate and framing members and shimmed and leveled to uniform plane. Space support framing at intervals indicated and not less than that required to achieve design for performance requirements.
- E. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action with permanent applied material as indicated in ACCESSORIES article in this Section. Where using applied coating, coat to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install metal panels and support system in accordance with Performance / Design Criteria and manufacturer's instructions.
- C. Protect surfaces in contact with cementitious materials and dissimilar metals with concealed bituminous paint. Allow to cure prior to installation.
- D. Fasten metal panels to structural supports; aligned, level, and plumb. Space fasteners maximum 24 inches on center either horizontally or vertically to suit application.
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners unless otherwise approved by Architect.
- G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Offset from True Alignment Between Adjacent Members Butting or In Line:
1/16 inch.
- C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove site cuttings from finish surfaces.
- C. Clean surfaces of installed work in accordance with manufacturer's recommendations.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed work from damage.

END OF SECTION

SECTION 07 42 93.13
METAL SOFFIT PANELS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Manufactured preformed metal soffit panels and suspension system.
- B. Related Requirements:
 - 1. Section 07 42 13 - Metal Wall Panels.
 - 2. Section 07 42 13.26 - Metal Composite Material Wall Panels.
 - 3. Section 07 62 00 - Sheet Metal Flashing and Trim.
 - 4. Section 07 90 00 - Joint Protection.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
 - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
 - 2. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.
 - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 - 4. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on panels and hanging system; include metal types, finishes, and characteristics.
- C. Design Data: Submit design calculations.
- D. Shop Drawings: Indicate dimensions, layout, joints, expansion joints, construction details, panel profiles, methods of anchorage, and interface with adjacent materials.
- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

- G. Manufacturer's Installation Instructions: Submit special procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing Work of this Section with minimum five (5) years documented experience and approved by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.
- D. Prevent contact with materials that may cause discoloration or staining of products.

1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish twenty (20) year manufacturer warranty to cover degradation of panel finish, including color fading caused by exposure to weather.
- C. Furnish five (5) year installer warranty to cover defects in water tightness and integrity of seals.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design and size system components and support system to support wall panel system dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to soffit plane.
 - 1. Wind Design Pressure:
 - a. As indicated on Drawings, in accordance with ASCE 7, and in accordance with the State Building Code for the State in which the project is located.
 - 2. Maximum Allowable Deflection of Panel: 1/180 of span.
- B. Thermal Movement: Allow for thermal movement from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.

2.2 METAL SOFFIT PANELS

- A. Manufacturers:
 - 1. AEP-Span.
 - 2. ATAS International, Inc.
 - 3. Berridge Manufacturing Company.
 - 4. Dimensional Metal, Inc. (DMI).
 - 5. Fabral.
 - 6. McElroy Metal, Inc.

7. Metal Roofing Systems, Inc.
 8. Petersen Aluminum Corporation (PAC).
- B. Basis of Design:
1. Petersen Aluminum Corporation (PAC).

2.3 COMPONENTS

- A. Precoated Metal Sheet:
1. Precoated Aluminum Sheet:
 - a. Comply with the following:
 - 1) ASTM B209/B209M, aluminum alloy and temper to be as required for structural performance requirements.
 - b. Thickness:
 - 1) 18 gauge (0.040 inch) (1.02 mm) thick minimum.
 - c. Continuous coil-coated on exposed surfaces with specified finish coating and on concealed surfaces with specified concealed surfaces coating.
 2. Strippable Film: Apply to the exposed surface of finished coil to protect the finish during fabrication, shipping, and field handling. Strippable film to be removed as recommended by manufacturer.
- B. Exterior Metal Panels: Factory formed.
1. Installation Direction:
 - a. As indicated on Drawings.
 2. Panel Width:
 - a. 12 inches, unless indicated otherwise on Drawings.
 3. Panel Depth:
 - a. 1 inch depth.
 4. Profiles:
 - a. Flush.
 - 1) Panel widths greater than 8 inches to have single V groove for stiffening.
 5. Panel Edges: Concealed fastened and continuous interlocking edge.
 6. Panel Venting Type:
 - a. Full-Vented type panels.
 - 1) All locations unless otherwise indicated on Drawings.
 7. Color: As selected by Architect from manufacturer's full range of colors.
- C. Trim, Closures, Caps, Flashings, Facias and Infills: Same material, thickness, and finish as metal panels; brake formed to required profiles.
- D. Fasteners to be concealed; self-tapping screws and other acceptable fasteners recommended by panel manufacturer; non-corrosion type compatible with materials being fastened and substrate. Where exposed fasteners are required for special trim conditions, fastener heads to be factory finished to match the finish of the adjacent material finish.
- E. Suspension System:
1. Steel main runners, hanger wires and hat channels; galvanized finish. Thickness and profile as required to support specified loads within specified Performance Requirements.
 - a. Minimum Requirements:
 - 1) Main Runners: Cold rolled channels, galvanized finish; 16 gauge, 1-1/2 inches deep.
 - 2) Hanger Wire: 12 gauge, galvanized, soft annealed steel wire.
 - 3) Hat Channels: ASTM C645; 25 gauge, galvanized.

2.4 FABRICATION

- A. Form sections to shapes indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.

2.5 FACTORY APPLIED FINISH

- A. Exposed Surface Finish:
 - 1. AAMA 2605: Fluoropolymer coil coating system. Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil (0.0009 inch) (0.023 mm). Color and gloss as selected by Architect from manufacturer's full range.
- B. Concealed Surface Finish: Manufacturer's standard coating, minimum 0.5 mil dry film thickness; compatible with finish system, as recommended by finish system manufacturer.

2.6 ACCESSORIES

- A. Sealants: Silicone type as specified in Section 07 90 00 - Joint Protection.
- B. Field Touch-up Paint: As recommended by material manufacturer.
- C. Separator for Dissimilar Materials: Separate dissimilar materials to prevent galvanic, chemical, and other corrosive action by applying a permanent separator material.
 - 1. Separator Material Requirements:
 - a. Permanent type that will remain concealed in the applied location without running, staining, or migrating onto visible finish surfaces.
 - b. Material approved by manufacturers of materials being separated.
 - 2. Separator material may include the following if it complies with the indicated separator material requirements.
 - a. Zinc molybdate alkyd coating, minimum dry film thickness of 15 mil.
 - b. Bituminous coating, minimum dry film thickness of 15 mil.
 - c. Self-adhering rubberized asphalt sheet.
 - d. Other permanent separator material complying with indicated requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify building framing members are ready to receive soffit panel system.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Dissimilar Materials: Provide permanent separation of dissimilar materials. Refer to ACCESSORIES article in this Section.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.

- B. Install metal panels and support system in accordance with Performance / Design Criteria and manufacturer's instructions.
- C. Protect surfaces in contact with cementitious materials and dissimilar metals with concealed bituminous paint. Allow to cure prior to installation.
- D. Main Runners: Suspend from building structure; parallel to soffit panels installation; spaced not greater than 48 inches o.c.
- E. Hat Channels: Secure perpendicular to main runners as required for attachment of metal panels and spaced not greater than 24 inches o.c.
- F. Add struts as required to resist upward pressure.
- G. Fasten metal panels to suspension system; aligned and level.
- H. Use concealed fasteners unless otherwise approved by Architect.
- I. Seal to prevent weather penetration. Maintain neat appearance.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Offset from Indicated Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water. Rinse with clean water.
- D. Upon completion of installation, thoroughly clean prefinished surfaces in accordance with manufacturer's recommendations.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
 - 1. Protect installed Work from damage.

END OF SECTION

SECTION 07 54 23**THERMOPLASTIC-POLYOLEFIN ROOFING (ADHERED)****PART 1 GENERAL****1.1 SUMMARY**

- A. Work Includes:
 - 1. Install a fully adhered, thermoplastic-polyolefin (TPO) membrane and flashings to provide a permanently watertight roofing system.
- B. Related Requirements:
 - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
 - 2. Section 07 22 16.10 - Roof Insulation For Membrane Roofing.
 - 3. Section 07 62 00 - Sheet Metal Flashing and Trim.
 - 4. Section 07 72 00 - Roof Accessories.
 - 5. Section 07 72 33 - Roof Hatches.
 - 6. Division 23 - Mechanical (HVAC) for Section related to roof mounted equipment.

1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures, Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
 - 1. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer; 2016, Reapproval 2022.
 - 2. ASTM D751 - Standard Test Methods for Coated Fabrics; 2019.
 - 3. ASTM D6754/D6754M - Standard Specification for Ketone Ethylene Ester Based Sheet Roofing; 2023.
 - 4. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2021.
 - 5. ASTM D7635/D7635M - Standard Test Method for Measurement of Thickness of Coatings Over Fabric Reinforcement; 2018.
- C. Cool Roofs Rating Council (CRRC):
 - 1. CRRC (DIR) - Cool Roofs Rating Council Directory; Current Edition.
 - 2. CRRC-1 - Roof Product Rating Program Manual; 2024.
- D. Factory Mutual (FM):
 - 1. FM (AG) - FM Approval Guide; Current Edition.
 - 2. FM DS 1-28 - Wind Design; 2015, with Editorial Revisions 2024.
- E. International Code Council, Inc. (ICC); International Building Code (IBC):
 - 1. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. Underwriters Laboratories Inc. (UL):
 - 1. UL (DIR) - Online Certifications Directory; Current Edition.
 - 2. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

- B. Convene one week before starting work of this Section. Review preparation and installation procedures and coordinating and scheduling required with related work.
- C. Meeting is to include coordination of requirements for roofing insulation and roofing membrane as a complete roofing system.
- D. Meeting Agenda: Agenda is to include organizational structure for personnel Installer, subcontractors, materials suppliers, and the Project Manager; channels and procedures for communication; construction schedule, including sequence of critical work; Contract Documents, including distribution of required copies of Contract Documents and revisions; processing of submittals; rules and regulations governing performance of the Work and procedures for safety, first aid, security, quality control, housekeeping and related matters.

1.4 SUBMITTALS

- A. Refer to Section 01 33 00 - Submittal Procedures for Submittals.
- B. Submittals for roofing insulation, overlay, and barrier components of the roofing system are to coincide with the submittal of the roofing membrane as a complete roofing system.
- C. Product Data: Submit complete data sheets, including characteristics on membrane materials, adhesives, seaming materials, flashing materials, and insulation components.
- D. Shop Drawings: Submit complete set of shop drawings indicating all installation details required for the roofing system installation. Note all additional required materials, including joint and termination detail conditions, cants, and conditions of interface with other materials. Indicate membrane layout and seam locations. Shop drawings must be sealed, signed, and dated by an engineer registered in the State in which the project is located.
- E. Submit documentation of approved, tested roof system indicating compliance with requirements indicated in PERFORMANCE REQUIREMENTS article in this Section.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.
- H. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- I. Installer's Certificate: Certify products meet or exceed specified requirements.
- J. Manufacturer's Installation Instructions:
 - 1. Include special precautions required for seaming membrane.
 - 2. If color application is required, include installation instructions.
- K. Warranty sample(s).

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: The requirements of this Section are to be coordinated and executed by the same company as the requirements specified in Section 07 22 16.10 - Roofing Insulation for Membrane Roofing as an integral part of the overall roofing system.
- B. Manufacturer Requirements:
 - 1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum ten (10) years of documented experience.
 - 2. Manufacturer must have a written Contractor/Installer approval program.
 - 3. The product must have a continuous manufacturing history with the current product formulation of no less than ten (10) years in the United States of America.
 - 4. Membrane Manufacturer's Technical Representative: Monthly interim inspections and reporting; punch list inspection and report; final inspection and report.

Manufacturer's technical representative is to provide a copy of reports to Owner, Architect and Roofing Designer within four (4) days of each inspection.

- C. Manufacturer's Field Services: During construction and until substantial completion, manufacturer's representative shall perform quality assurance site visits every ten working days to ensure materials are being properly installed and as required to obtain the specified warranty.
1. The first site visit shall be performed within the first three (3) days of operations.
 2. Notify the Architect, Roofing Designer and Owner of all site visits. Submit reports of findings to the Architect, Roofing Designer and Owner within one week of inspection. Payment applications will be subject to rejection until applicable reports are received.
 3. Inspections to be performed by an employee of the selected manufacturer that is assigned full time to their technical services department. Sales personnel will not be acceptable for this function.
 4. Notify the Architect, Roofing Designer and Owner of the Manufacturer's final inspections. A minimum of seven (7) days written notice is required. If required notification is not provided and the Architect, Roofing Designer or Owner wish to attend, the Architect, Roofing Designer and Owner may require reinspections by the Manufacturer's inspector at no additional cost to the Owner.
- D. Installer Requirements:
1. Installer Qualifications: Company specializing in performing work of this section with at least five (5) years of documented experience and approved by manufacturer.
 2. This roofing system shall be installed only by an Installer authorized by the membrane manufacturer prior to bid.
 3. Application of the roofing system shall be accomplished by a primary roofing Installer, Installer's roofing foreperson, and sufficient Installer technicians trained and approved by the manufacturer of the roofing membrane. Installer is to submit evidence of qualification from the manufacturer.
 4. Installer of the work of this Section is to be the same as the Installer of the work of Roofing Insulation, and Sheet Metal and Trim as specified in Division 07 - Thermal and Moisture Protection.
- E. Upon completion of the installation an inspection shall be made by a representative of the membrane manufacturer to review the installed roof system and list all deficiencies.
- F. There are to be no deviations made from the Contract Documents without prior written approval by the Architect or Owner and the membrane manufacturer.
- G. All work shall be completed by personnel trained and authorized by the membrane manufacturer.
- H. Provide manufacturer written verification indicating all seams have been probed and are watertight.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.
- C. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.
- D. Follow manufacturer's requirements for storing membrane rolls. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas

tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

- E. All adhesives shall be stored at temperatures required by the manufacturer.
- F. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
- G. All materials which are determined to be damaged by the Architect, Roofing Designer, Owner, or membrane manufacturer are to be removed from the job site and replaced at no cost to the Owner.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Roofing shall not be applied during precipitation.
- B. Only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be cleaned, and heat welded before leaving the job site that day.
- C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather.
 - 1. The existing building and its contents shall be protected against all risks.
- D. All surfaces to receive insulation, membrane, or flashings shall be dry. Should surface moisture occur, provide the necessary equipment to dry the surface prior to application of subsequent materials.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- F. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.
- G. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A protection layer of plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.
- H. Prior to and during application, all dirt, debris, and dust shall be removed from surfaces, either by vacuuming, sweeping, blowing with compressed air, and/or similar methods.
- I. Contaminants, such as grease, fats, oils, and solvents, shall not be allowed to contact the roofing membrane.
- J. The roofing membrane shall not be installed under the following conditions without consulting the membrane manufacturer's technical department for precautionary steps:
 - 1. The roof assembly permits interior air to pressurize the membrane underside.
 - 2. Any exterior wall has 10 percent or more of the surface area comprised of opening doors or windows.
 - 3. The wall/deck intersection permits air entry into the wall flashing area.
- K. Precautions shall be taken when using membrane adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air

intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Always maintain lid covering on unused cans.

1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Each warranty is to expressly acknowledge that issuance is after warranty provider's final inspection of installed roofing system.
- C. Manufacturer's Warranty: Manufacturer agrees to provide materials and labor to promptly repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks or breaches in roofing system that allows moisture to enter the substrate below, even if visible leaks are not observed within the facility. Warranty to be non-pro-rated and without monetary limitation or deductibles. Warranty to include insulation, membrane, sheathing board, thermal barrier, roof vapor barrier, overlayment cover board, insulation fasteners, mastics, adhesives, metal copings and edge metal, metal flashings, flashings, sealants, and base flashings. Warranties requiring the Owner's signature will not be acceptable.
 - 1. Warranty Period:
 - a. Thirty (30) years from date of Final Acceptance.
- D. Installer's Warranty: Roof System Warranty to cover workmanship for all work of this Section and roof insulation components including, but not limited to, installation of roofing insulation components such as sheathing boards, vapor retarders, insulation boards, cover boards, roofing membrane, flashings, metal work, roofing accessories and attachment construction.
 - 1. Warranty Period: Five (5) years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Roofing system to meet or exceed the following:
 - 1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
 - 2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90.
- B. Wind Design:
 - 1. Install roofing system to meet or exceed the requirements of the current adopted version of ASCE-7, and State Building Code in the State in which the project is located. Refer to Structural Drawings for design loads for this project.

2.2 ROOFING INSULATION MATERIALS

- A. Insulation system materials are to be manufactured or approved by roof membrane manufacturer as integral part of overall roofing system.
- B. Comply with requirements indicated in Section 07 22 16.10 - Roof Insulation For Membrane Roofing.

2.3 ROOFING MEMBRANE MATERIALS

- A. Manufacturers:
 - 1. Carlisle SynTec Systems.
 - 2. Firestone Building Products.
 - 3. GAF Corporation.
 - 4. GenFlex Roofing Systems.

5. Johns Manville.
 6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Roof Membrane: Thermoplastic-polyolefin (TPO) membrane complying with ASTM D6878/D6878M; polyester reinforcement and factory applied fleece backing.
1. Sheet Total Thickness: Tested in accordance with ASTM D751.
 - a. 80 mil, 0.080 inch (2 mm), minimum.
 2. Sheet Thickness Above Reinforcing Fabric Scrim: Minimum 36 percent of sheet total thickness, measured in accordance with ASTM D7635/D7635M.
 3. Sheet Width: 10 feet (3.048 m).
 4. Sheet Color and Solar Reflectance: Minimum value when tested in accordance with ASTM C1549 and listed by CRRC (DIR). Field applied coating cannot be used to achieve indicated values.
 - a. White: Initial SR value of 0.76. Three-year aged SR value of 0.68.
 5. Basis of Design:
 - a. GAF Corporation - EverGuard Extreme TPO.
- C. Flashing:
1. Reinforced 80 mil thick, TPO membrane for walls and curbs.
 2. Unsupported 80 mil. thick, TPO membrane shall be supplied for field fabricated vent stacks, pipes, drains and corners.
 3. Manufacturer to be same as Roof Membrane manufacturer.
- D. Fully Adhered Low-Profile Expansion Joint: Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to plus or minus 1 inch, and capable of 500 percent elongation at - 40 degrees F across its length and at all vulcanized points. All details and connections to be factory fabricated by means of vulcanization for one-piece installation.

2.4 ASSOCIATED MATERIALS

- A. Adhesive: Shall be membrane manufacturer's solvent based reactivating type.
- B. T-joint Patch: Shall be membrane manufacturer's circular patch welded over T-joints formed by overlapping thick membranes.
- C. Corner Flashing: Shall be membrane manufacturer's pre-formed inside and outside flashing corners that are heat-welded to membrane or polymer clad metal base flashings.
- D. Termination Bar: Shall be manufacturer's 1/8 inch by 1 inch, mill finish, extruded aluminum bar with pre-punched slotted holes.
- E. Sealant: Shall be manufacturer's multi-purpose sealant.
- F. Fasteners:
1. Concrete and Masonry Flashing Membrane Termination Anchors:
 - a. 1/4 inch diameter metal based expansion anchor with stainless steel pin of length required to penetrate substrate a minimum of 1-1/2 inches.
 - b. Masonry screws to be approved by membrane manufacturer, 1/4 inch minimum diameter, corrosion resistant, with Phillips flat head. Length required to provide minimum 1.5 inches embedment into substrate.
 2. Solid Concrete Deck Fasteners and Plates: Shall be nail-in, non-threaded fasteners with split bulb tip designed for securement of membrane and insulation to structural concrete roof decks, length required to penetrate deck a minimum of 1 inch with plates as approved by roof membrane manufacturer.

- G. Primary Membrane Cleaner: Shall be a high quality solvent cleaner provided by membrane manufacturer and approved by Architect or Roofing Designer for use as a general membrane cleaner.
- H. Pre-weld Cleaner: Shall be a high quality solvent based seam cleaner with moderate evaporation rate provided by membrane manufacturer.
- I. Walkway Pad: Shall be walkway pad by membrane manufacturer. Color shall differ from the roofing membrane sheet.
- J. Polymer Clad Metal: Refer to Section 07 62 00 - Sheet Metal Flashing and Trim.

PART 3 EXECUTION

3.1 SUBSTRATE PREPARATION

- A. Verify that the substrate is dry, clean, smooth, and free of loose material, oil, grease, or other foreign matter. Sharp ridges and other projections and accumulations of bitumen shall be removed to ensure a smooth surface before roofing.
- B. Any deteriorated substrate shall be repaired.
- C. Beginning installation means acceptance of prepared substrate.
- D. Provide necessary protection from adhesive vapors to prevent interaction with foamed plastic insulation.

3.2 MEMBRANE INSTALLATION

- A. Install specified sheathing, barriers, insulation, and overlay components of roofing system prior to installing roofing membrane component.
 - 1. The installation of the substrate and components is to be inspected prior to installation of the roofing membrane. The substrate is to be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged components are to be removed and replaced prior to installation of the roofing membrane.
- B. Membrane installation to be fully adhered and in compliance with the manufacturer's requirements and as indicated in this Section.
- C. Position membrane over the properly installed and prepared substrate.
- D. Fold membrane back lengthwise so half the underside of the membrane is exposed.
- E. Adhesive shall be applied using solvent-resistant 3/4 inch nap paint rollers. The adhesive shall be applied to the substrate and back side of the membrane at a rate according to the membrane manufacturer's requirements. Apply the adhesive smooth and even coatings with no gaps, globs, puddles, or similar inconsistencies. Allow the adhesive to dry until it is tacky but will string or stick to a dry finger touch.
 - 1. The Applicator is to maintain daily record of adhesive amount used per area per day to verify conformance to the specified adhesive rate.
 - 2. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.
- F. Roll the adhesive coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded section of the membrane immediately after rolling the membrane into the adhesive with a soft bristle broom to achieve maximum contact.
- G. Fold back the unbounded half of the sheet lengthwise and repeat the bonding procedures. This process is repeated throughout the roof area.

- H. Position adjoining sheets to allow a minimum overlap of 2 inches and hot-air weld.
- I. Weld membrane cover strips at all felt-back membrane seams without a factory selvage edge.
- J. Terminate membrane at all walls as indicated on Drawings.
 - 1. Concrete/Masonry Substrate: Membrane shall be turned up wall one inch and mechanically terminated using approved anchors eight inches on center with a termination bar.
- K. Terminate membrane at all penetrations as indicated on Drawings.
 - 1. Membrane shall be terminated six inches on center or a minimum of four fasteners per penetration into the structural deck using fasteners and plates as approved by the membrane manufacturer for the deck substrate.
- L. Membrane shall extend over roof edge a minimum of 2 inches below the perimeter wood blocking. If fleece-back membrane is utilized, trim membrane flush with outside edge of roof and hot-air weld a non-fleece back flashing membrane to extend over the roof edge.

3.3 FLASHING INSTALLATION

- A. General:
 - 1. Provide adhesives and flashing materials that are compatible with substrate.
 - 2. Flashings shall be installed concurrently with the roof membrane as the job progresses.
 - 3. No temporary flashings shall be allowed without the prior written approval of the Architect or Roofing Designer, and Manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at no cost to the Owner.
 - 4. Seams shall not be "taped" as temporary measure but shall be fully completed before the end of each day.
 - 5. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces.
 - 6. Do not allow adhesive fumes are not drawn into the building.
- B. Adhesive for Flashing Membrane:
 - 1. Over the properly installed and prepared flashing substrate, flashing adhesive shall be applied according to manufacturer's written instructions. Apply the membrane adhesive in smooth and even coats with no gaps, globs, or similar inconsistencies.
 - 2. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
 - 3. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels required by welding techniques.
- C. All flashings shall be mechanically terminated at a minimum of 8 inches above the finished roofing surface using approved fasteners and counterflashing bar unless otherwise indicated on the Drawings. Flashing heights less than 8 inches shall be accepted in writing by the Manufacturer's Technical Department.
- D. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut, and hot-air welded into place. No bitumen shall be in contact with the roof membrane.
- E. All flashings shall be hot-air welded at their joints and at their connections with the (roof) membrane.
- F. All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement. Consult Manufacturer's Technical Department for securement methods.

- G. Corners shall be flashed using the membrane manufacturer's pre-formed corners.
- H. Polymer Clad sheet metal incorporated into the roofing system shall be sealed off with a heat welded stripping ply. The stripping ply shall extend four inches beyond sheet metal onto roof membrane and fit closely to fit closely to edge of sheet metal.
- I. Soil Pipe/Pipe Penetration:
 - 1. Provide field wrapped pipe penetration flashing.
 - 2. Apply aluminum tape to penetration if asphalt contamination is present.
 - 3. Extend existing pipe to obtain a minimum 8 inches finished flashing height.
 - 4. Cut existing pipe to obtain a maximum 12 inches finished flashing height.
 - 5. Horizontal flashing membrane shall be hot-air welded a minimum of four inches onto the membrane.
 - 6. Vertical flashing membrane shall be fully adhered to pipe penetration and extend a minimum of 1.5 inches horizontally at the base of penetration. Hot-air weld vertical flashing membrane to horizontal flashing membrane.
 - 7. Install stainless steel draw band and sealant or hot-air weld flashing cap to terminate top edge of pipe flashing.

3.4 HOT-AIR WELDING OF SEAM OVERLAPS

- A. General:
 - 1. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.
 - 2. Welding equipment shall be provided by or approved by the membrane manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a membrane manufacturer's technical representative prior to welding.
 - 3. All membrane to be welded shall be clean and dry.
- B. Hand-Welding:
 - 1. Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
 - 2. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
 - 3. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1-1/2 inches (40 mm) wide nozzle is recommended for use. For corners and compound connections, the 3/4 inch (20 mm) wide nozzle shall be used.
- C. Machine Welding:
 - 1. Machine welded seams are achieved using automatic welding equipment. When using this equipment, instructions from the manufacturer shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated off the generator.
 - 2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.
- D. Quality Control of Welded Seams:
 - 1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey

material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the Designer or membrane manufacturer's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

- E. Provide cut edge sealant over all cut edges of reinforced membrane after seam probing has been completed.
- F. Install T-joint patch at all T-seam locations.

3.5 WALKWAY PAD INSTALLATION

- A. Install walkway pads at locations indicated on Drawings and at all roof access ladders, hatches, stairs, and doors with pathways leading to and around all mechanical equipment.
- B. Roofing membrane to receive walkway pad shall be clean and dry.
- C. Place chalk lines on deck sheet to indicate location of Walkway.
- D. Apply a continuous coat of membrane adhesive to the deck sheet and the back of walkway pad in accordance with membrane Manufacturer's technical requirements and press walkway pad into place with a water-filled, foam-covered lawn roller.
- E. Clean the deck membrane in areas to be welded. Hot-air weld the entire perimeter of the walkway to the roofing membrane.
- F. Check all welds with a rounded screwdriver. Re-weld any inconsistencies.
- G. Check all existing membrane seams that are to be covered by walkway with rounded screwdriver and re-weld any inconsistencies before walkway installation.

3.6 TEMPORARY CUT-OFF

- A. All flashings shall be installed concurrently, with the membrane to maintain a watertight condition as the work progresses.
- B. When a break in the day's work occurs in the central area of the project install a temporary watertight seal. An 8 inches strip of flashing membrane shall be welded 4 inches to the new field membrane. The remaining 4 inches of flashing membrane shall be sealed to the deck and/or the substrate so that water will not be allowed to travel under the new or existing membrane. The edge of the membrane shall be sealed in a continuous heavy application of pourable sealer of 6 inches width. When work resumes, the contaminated membrane shall be removed and disposed of. None of these materials shall be reused in the new work.
- C. If inclement weather occurs while a temporary water stop is in place, provide the labor necessary to monitor the situation to maintain a watertight condition.
- D. If any water is allowed to enter under the newly completed system, the affected area shall be removed and replaced at no cost to the Owner.

3.7 MANUFACTURER'S FIELD SERVICES

- A. Section 01 40 00 - Quality Requirements: Manufacturer's field services.
- B. Refer to QUALITY ASSURANCE article in Part 1 of this Section for requirements.

3.8 CLEANING AND PROTECTION

- A. Protect the roof from construction related damages during the Work.

- B. Remove trash and debris from the roof daily.
- C. Metal scraps, nails, screws, and other sharp damaging debris shall be kept off the roof membrane surface during construction.
- D. Remove excess adhesive, sealant, stains, and residue from the membrane and flashing surfaces.
- E. Repair, or remove and replace damaged membrane, flashings, and other roofing components. Repairs shall be in accordance with the membrane manufacturer's repair instruction to comply with the specified warranty.
- F. Remove temporary coverings and masking protection from adjacent work areas upon completion. Remove construction debris from the project site on a planned and regular basis.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
1. Fabrication and installation of sheet metal flashings and trim to provide permanently watertight conditions. Items include:
 - a. Coping Caps.
 - b. Roof Edge.
 - c. Flashings.
 - d. Counterflashings.
 - e. Counterflashing Receivers.
 - f. Fascia.
 - g. Through Wall Scupper with exterior escutcheon.
 - h. Other items as indicated on Drawings.
 2. Sealants for joints within sheet metal fabrications.
- B. Related Requirements:
1. Section 04 20 00 - Unit Masonry: Metal flashings embedded in masonry.
 2. Section 04 72 00 - Cast Stone Masonry.
 3. Section 06 10 53 - Miscellaneous Rough Carpentry.
 4. Division 07 - Thermal and Moisture Protection: Roofing, gutters, downspouts, roof accessories, roof hatches, and joint protection.
 5. Division 08 - Opening: Metal flashings for curbs of skylights and similar openings.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
 3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American National Standards Institute (ANSI); Single Ply Roofing Industry (SPRI); Factory Mutual (FM):
1. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2022.
- C. ASTM International (ASTM):
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
 2. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
 3. ASTM B32 - Standard Specification for Solder Metal; 2020.

4. ASTM B101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction; 2022.
 5. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 6. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2022.
 7. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2020.
 8. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
 9. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.
 10. ASTM D1005 - Standard Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers; 1995, Reapproval 2020.
 11. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments; 2008, with Editorial Changes 2017.
 12. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing; 2015a, Reapproval 2021.
 13. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2023.
 14. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2023.
 15. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2012, Reapproval 2018.
 16. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2012, Reapproval 2018.
 17. ASTM D7091 - Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals; 2022.
- D. National Roofing Contractors Association (NRCA):
1. NRCA (RM) - The NRCA Roofing Manual; 2024.
- E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
1. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this Section and in conjunction with roofing pre-installation meeting.

1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal procedures.
- B. Product Data: Submit product data for materials specified certifying compliance with specified requirements.
- C. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated

for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

- F. Samples of Fabrications: Fabricate and submit one sample of each of the following illustrating configuration, dimensions, finishes, joinery, bends, corners, fasteners, seals, concealed surfaces finish and include material to be used as separator for contact with dissimilar construction materials.
1. Coping Cap Corner, assembled.
 2. Roof Edge.
 3. Counterflashing and Counterflashing Receiver, assembled.
 4. Fascia.
 5. Exposed Fasteners.
 6. Through Wall Scupper with exterior Escutcheon.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in sheet metal work with ten (10) years of documented experience.
- B. Installer Qualifications: Company specializing in sheet metal work with ten (10) years of documented experience.
1. Installer to be same as installer of the roofing system indicated in Division 07 - Thermal And Moisture Protection.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage. Ensure materials remain dry, covered and not in contact with the ground.
- C. Prevent contact with materials that could cause discoloration or staining. Protect stored materials from damage and contamination with moisture or foreign matter.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Protect the Work from intrusion of weather elements during installation duration.

1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- C. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.
- D. Coordinate all phases of Work to provide continuity of Work without delays.

1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Factory Applied Metal Finishes Warranty:

1. Provide manufacturer's metal finish warranty in which manufacturer agrees to repair finish or replace metal that shows evidence of deterioration of factory applied finish within the indicated warranty period.
2. Deterioration includes, but is not limited to the following:
 - a. Color fading exceeding 5 delta E Hunter color units in accordance with ASTM D2244.
 - b. Peeling, checking, or cracking of coating adhesion to metal.
 - c. Chalking exceeding a No. 8 in accordance with ASTM D4214, Method A.
 - d. Corrosion of substrate exceeding a No. 6 on cut edges and a No. 8 on field surfaces, when measured per ASTM D1654.
3. Warranty Period:
 - a. Twenty (20) years from the project date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and is to remain watertight.
- B. Factory Mutual approved for wind uplift protection.
- C. Wind Design Standard: Manufacture and install copings and roof edge flashing systems tested as compliant with ANSI/SPRI/FM 4435/ES-1 requirements and capable of resisting the following design pressure:
 1. Design Pressure: As indicated on Drawings.
- D. Sheet Metal Standard for Flashing and Trim: Comply with NRCA (RM) and SMACNA (ASMM) requirements for dimensions and profiles shown unless more stringent requirements are indicated in the Contract Documents.
 1. Maintain one copy of each document on site.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 MANUFACTURERS

- A. Manufacturers:
 1. Architectural Products Company.
 2. Hickman Edge Systems, Inc.
 3. Merchant and Evans.
 4. Metal-Era, Inc.
 5. OMG Roofing Products.
 6. PAC-CLAD; Petersen Aluminum Corporation.
 7. Perimeter Systems; a division of SAF.
 8. SAF, Southern Aluminum Finishing Company.
 9. Substitutions: Section 01 60 00 - Product Requirements.

2.3 METAL SHEET MATERIALS

- A. Base Metal Thickness Table: Metal thickness minimum to be as indicated in the following table unless indicated otherwise on Drawings. Face dimensions indicated apply to the largest dimensional face of a linear or formed metal fabrication and includes the outward angled drip edge.

Face Dimension	Galvanized Steel	Aluminum	Stainless Steel
Up to 4 in. (to 100 mm)	24 ga. (0.028 in.) (0.7 mm)	0.032 in. (0.82 mm)	26 ga. (0.016 in.) (0.4 mm)
> 4 in. - 8 in. (> 100 - 200 mm)	24 ga. * (0.028 in.) (0.7 mm)	0.040 in. * (1.0 mm)	26 ga. * (0.016 in.) (0.4 mm)
> 8 in. - 10 in. (> 200 - 250 mm)	22 ga. ** (0.034 in.) (0.9 mm)	0.050 in. ** (1.3 mm)	24 ga. ** (0.023 in.) (0.6 mm)
> 10 in.-16 in. (> 250 - 400 mm)	20 ga. (0.040 in.) (1.0 mm)	0.063 in. (1.6 mm)	22ga. (0.029 in.) (0.7 mm)
> 16 in. - 24 in. (> 406 mm - 610 mm)	20 ga. (0.040 in.) (1.0 mm)	0.063 in. (1.6 mm)	22ga. (0.029 in.) (0.7 mm)

Key Notes: Minimum thickness for the following components; thicker depending on face dimension:
 * Minimum thickness for Roof Edge, Fascia, and Cleats.
 ** Minimum thickness for Coping Caps.

- B. Pre-Finished Aluminum Sheet: ASTM B209/B209M, 3003 or 3005 alloy, H12 or H14 temper with factory applied pre-finish coating system as follows:
1. Superior Performance Organic Coating System: AAMA 2605, shop applied multiple coats, thermally cured polyvinylidene fluoride (PVDF) resin system.
 - a. Three-Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in each color coat and clear topcoat. Prepare, pre-treat, and apply coatings.
 - 1) Dry Film Minimum Thickness: ASTM D7091.
 - a) Primer Coat: 0.20 to 0.40 mil.
 - b) Color Coat: 0.70 to 0.90 mil.
 - c) Clear Coat: 0.40 to 0.50 mil.
 - d) Total Thickness: 1.30 to 1.80 mils.
 - b. Surface: Smooth.
 - c. Color: To be selected by Architect for manufacturer's full range.
 - d. Gloss: To be selected by Architect for manufacturer's full range.
 - e. Concealed Finish: Pretreat with 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.
- C. Stainless Steel: ASTM A666, Type 304 alloy, soft temper.
1. Finish:
 - a. No. 4 - Brushed finish.
- D. Protective Film: Factory apply strippable plastic film to material surfaces to protect the finish during fabrication, shipping, handling, and installation.

2.4 POLYMER CLAD METAL

- A. Polymer Clad Metal - Metal flashings and trim manufactured with roofing membrane laminated cladding; heat-weldable cladding for watertight seal to roofing membrane; 25 mil thick cladding membrane coating to match the flashing membrane composition laminated on one side. Polymer-clad metal to be manufactured by, and included in the warranty of, the roofing membrane manufacturer. Color to be selected by Architect from manufacturer's full range.

- B. Polymer clad metal type to be that which is indicated for flashing and trim components.
- C. Metal flashings and trim components to be fabricated with polymer clad metal include the following:
 - 1. Items indicated on Drawings.

2.5 COPING CAPS

- A. Manufactured system in section lengths not less than 10 feet (12 feet preferred); concealed anchorage; with corner units, end cap units, and concealed splice plates. All exposed components to match in material and finish.
 - 1. Pre-finished aluminum sheet; sloped top at 1/2 inch per foot.
 - 2. Configuration: As indicated on Drawings.
 - 3. Corner and End Cap Units: Factory mitered.
 - a. Fabricate corner and end cap units to form single fabricated units.
 - 1) Minimum length of corner caps to be twice the thickness of wall assembly in each direction.
 - 2) Minimum length of end cap units to be twice the thickness of wall assembly.
 - b. Joints:
 - 1) Continuously welded. Apply specified finish after fabrication.
 - 4. Joint Splice Plates: Material and finish to match coping cap; 6 inches wide minimum; factory applied neoprene sealant strip each edge to maintain waterproof assembly.
 - 5. Face-Leg Cleats: Continuous each side; spring action linear support at mid-span of coping cap sloped top.
 - 6. Surface: Smooth.
 - 7. Color: To be selected by Architect from manufacturer's full range.

2.6 ROOF EDGE FASCIA

- A. Manufacture system in section lengths not less than 10 feet (12 feet preferred); concealed anchorage; with corner units, and concealed splice plates. All exposed components are to match in material and finish.
 - 1. Pre-finished aluminum sheet.
 - 2. Configuration: As indicated on Drawings.
 - 3. Corners Units: Factory mitered.
 - a. Fabricate corner units to form single fabricated unit.
 - b. Minimum length to be 24 inches in each direction.
 - c. Joints:
 - 1) Continuously welded. Apply specified finish after fabrication.
 - 4. Joint Splice Plates: 6 inches wide minimum; factory applied neoprene sealant strip each edge to maintain waterproof assembly.
 - 5. Face-Leg Cleats: Continuous.
 - 6. Surface: Smooth.
 - 7. Color: To be selected by Architect from manufacturer's full range.

2.7 THROUGH WALL SCUPPERS

- A. Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 6 inches beyond cant or tapered strip into field of roof. Continuous weld all joints. Fabricate from the following materials:
 - 1. Material: Aluminum; ASTM B209/B209M, 3003 or 3005 alloy, H12 or H14 temper.
 - 2. Fabricate scupper sleeve with polymer clad metal for watertight bond to match roofing membrane and flashing, unless indicated otherwise on Drawings.

3. Exterior Escutcheon: Required where no downspout conductor head is indicated for drainage. Fabricate unit; without seams; profile and configuration as indicated on Drawings; pre-finished aluminum and finish as specified in this Section; metal to be 0.050 inch thick metal with hemmed edges; color to be selected by Architect from manufacturer's full range.

2.8 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as fabricated sheet materials. Cleat thickness, width, and profile to be capable of withstanding loads and stresses required to secure and interlock with fabricated sheet materials.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- E. Fabricate vertical faces with bottom edge formed outward 1/2 inch and hemmed to form drip.

2.9 ACCESSORIES

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other accessories as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of materials to which application is made, unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design and wind loads and recommended by manufacturer of components being fastened. Exposed fasteners to be finished with matching finish system of material being fastened.
 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM waterproof sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
- C. Fasteners for securing components to treated lumber and/or plywood are to be stainless steel, or specifically manufactured with published approvals for treated lumber applications.
- D. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- E. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- F. Anchors: As required by application condition.
 1. Lead Anchors: Minimum 1/4 inch diameter lead anchor.
 2. Sleeve-Type or Wedge-Type based on application, minimum 5/8 inch diameter, Type 304 or 316 stainless steel, Expansion Anchor Bolt Assembly. Follow fastener manufacturer's published guidelines for substrate type and condition.
- G. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2-inch wide and 1/8 inch thick.
- H. Sealant primers: Primers to be manufactured by or approved by the sealant manufacturer. Primer types required for substrate and sealant as published by sealant manufacturer.

- I. Elastomeric Sealant: For exposed joints ASTM C920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight. Color to match adjacent material or
- J. Butyl Sealant: For concealed joints ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- K. Plastic Cement: ASTM D4586/D4586M, Type I.
- L. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D1187/D1187M.
- M. Underlayment Materials:
 - 1. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
 - 2. Slip Sheet: Rosin-sized building paper, 3 lbs/100 sq. ft. minimum.
- N. Primer:
 - 1. Aluminum and Stainless Steel: Zinc chromate primer.
 - 2. Galvanized Steel: Zinc chromate or galvanized iron primer.
- O. Reglets (Receivers): Type and configuration as indicated on Drawings. Material and finish to match metal flashing component to be secured into reglet. Material thickness to be as required by referenced standards but not less than 0.050 inch.
- P. Solder: ASTM B32; Sn50 (50/50) type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrates, surfaces, and conditions are ready to accept the work of this Section.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- D. Verify roofing termination and base flashings are in place, sealed, and secure.
- E. Verify that field measurements are as required.
- F. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Install starter and edge strips, and cleats before starting installation.
- D. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

- E. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Comply with Drawings and referenced standards.
- C. Installation is to comply with the sheet metal system and component manufacturer's published installation manuals and guidelines and all referenced standards therein.
- D. Installation of sheet metal flashings incorporated into roofing system are to comply with all minimum requirements published by the membrane manufacturer and requirements indicated in the Contract Documents.
- E. Coping and trim sections are to expand and contract freely while mechanically locked in place on anchor cleats.
- F. Coping and trim sections are to be locked to anchor cleats by mechanical pressure from support chairs.
- G. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
 - a. Install to seal watertight all rough carpentry, parapet walls, curbs, and roof transitions before installing sheet metal flashing.
 - b. The underlayment is to be left in place, not cut, or removed, before installing sheet metal flashing.
 - c. Cover underlayment with slip sheet for separation from metal work to be installed.
- H. Insert flashings into reglets to form tight fit; secure in place with lead or plastic wedges; seal flashings into reglets with sealant.
- I. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted by Architect.
- J. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.
- K. Apply plastic cement compound between metal flashings and felt flashings.
- L. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- M. Seal metal joints watertight.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for quality control of work and installation.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.5 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

END OF SECTION

SECTION 07 71 23
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Gutters.
 - 2. Downspouts.
 - 3. Downspout Boots.
 - 4. Conductor Heads (Collection Boxes).
 - 5. Splash Pads.
 - 6. Supports and Accessories.
- B. Related Requirements:
 - 1. Division 07 - Thermal and Moisture Protection: Sections related to roofing construction and joint protection.
 - 2. Division 33 - Utilities: Sections related to stormwater utility construction.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
 - 2. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. ASTM International (ASTM):
 - 1. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 20.
 - 2. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar, 2023.
 - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate, 2021a.
- C. National Roofing Contractors Association (NRCA):
 - 1. NRCA (RM) - The NRCA Roofing Manual; 2024.
- D. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
 - 1. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
 - 1. Coordinate Work with construction related to or interfacing with this Work.
 - 2. Coordinate Work with downspout discharge pipe inlets or connections, if any.

1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section and in conjunction with roofing pre-installation meeting.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, sizing, spacing, slope, calculations, and installation details.
- C. Product Data: Submit data on manufactured components, materials, and finishes.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
 - 1. Submit a gutter section and downspout section of minimum size 12 inches long illustrating actual metal, thickness, configuration, profile, color, and texture.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with these specifications and SMACNA (ASMM) - Architectural Sheet Metal Manual.
- B. Install Work in compliance with the current NRCA (RM).
- C. Install Work in compliance with the sheet metal system and component manufacturers' published installation manuals and guidelines and all referenced standards therein.
- D. Work to be free of leaks in all weather conditions.

1.7 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in installing the Work specified in this Section with minimum five (5) years documented experience.
- C. Installer to be same as installer of the roofing system indicated in Division 07 - Thermal And Moisture Protection.
 - 1. Company specializing in sheet metal work with minimum five (5) years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.
- C. Store materials within areas designated or approved by the Owner. Ensure materials remain dry, covered and not in contact with the ground.
- D. Handle material in such manner as to preclude damage and contamination with moisture or foreign matter.

1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide the pre-finished sheet metal manufacturer's thirty (30) year finish warranty from the date of substantial completion.

PART 2 PRODUCTS

2.1 PRE-FINISHED ALUMINUM

- A. Aluminum: ASTM B209/B209M, alloy 3003, H14 temper.
 - 1. Thickness: 0.040 inch (40-mil), unless indicated otherwise on Drawings or in this Section.
 - 2. Finish: Primed and finished on one side with fluoropolymer coating; multiple coats to minimum 1.0 mil total dry film thickness as specified for sheet metal system, thermally cured, conforming to AAMA 2604. On reverse side, finish with wash coat compatible with finish system as recommended by finish system manufacturer; wash coat to minimum 0.3 to 0.4 mil dry film thickness. A strippable plastic film should protect the finish during fabrication and installation.
 - a. Color and Sheen: To be selected by Architect from manufacturer's full range.

2.2 COMPONENTS

- A. Gutters:
 - 1. Pre-Finished Aluminum; 24 gauge; profile as indicated on Drawings.
- B. Downspouts:
 - 1. Pre-Finished Aluminum; 24 gauge; profile as indicated on Drawings.
- C. Downspout Boots: Cast iron; smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
 - 1. Basis of Design: J.R. Hoe and Sons.
 - 2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
 - 3. Configuration and Profile:
 - a. As indicated on Drawings.
 - 4. Finish: Manufacturer's standard factory applied powder coat finish.
 - a. Color:
 - 1) To be selected by Architect from manufacturer's full range.
 - 5. Accessories: Compatible with and appropriate for installation of downspout boots.
 - a. Stainless steel fasteners and building wall anchors.
 - b. Neoprene gaskets and rubber coupling.
- D. Conductor Heads (Collection Boxes):
 - 1. Pre-Finished Aluminum; 24 gauge; profile as indicated on Drawings.
 - 2. Pre-manufactured conductor heads to fit scupper drainage outlets and downspouts.
 - 3. Factory weld joints.
 - 4. Factory apply finish after fabrication.
- E. Splash Pads:
 - 1. Size: 3H x 11W x 30L inches unless indicated otherwise on Drawings.
 - 2. Material:
 - a. Precast concrete; minimum 3000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.

2.3 ACCESSORIES

- A. Anchors and Supports: Profiled to suit gutters and downspouts.
 - 1. Anchoring Devices: In accordance with SMACNA requirements.
 - 2. Gutter Supports:
 - a. Brackets - Configuration, size and metal thickness as indicated on Drawings. Finish to match gutter.
 - 3. Downspout Supports:
 - a. Straps, minimum 0.050 inch thick. Finish to match downspout.

- B. Fasteners: Same material and finish as gutters and downspouts.

2.4 FABRICATION

- A. Form components accurately to sizes and profiles indicated on Drawings.
- B. Fabricate with required connection components.
- C. Form component 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. Seal joints watertight.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Contractor is to coordinate all work for correct sequencing of items which make up the completed building envelope systems.
- C. Verify that surfaces are ready to receive work.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.
- D. Protect components to prevent scratches, dents, and other damages during the work and associated with the work of other trades.
- E. Verify that all exposed fasteners are pre-finished to match surface finish of the component being fastened.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install products in accordance with manufacturer's instructions.
- C. Sheet Metal: Join lengths with seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- D. Slope gutters 1/8 inch per foot minimum to drains.
- E. Connect downspouts to downspout boots at elevations indicated on Drawings; but, in no case is connection to be less than 4 inches above grade. Do not seal connection watertight.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean installed work and comply with manufacturer's recommendations.
- C. Clean adjacent soiled surfaces and comply with surface manufacturer's recommendations.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

END OF SECTION

SECTION 07 72 00
ROOF ACCESSORIES

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Curbs and equipment rails.
 - 2. Piping and conduit pedestals.
- B. Related Requirements:
 - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
 - 2. Division 07 - Thermal and Moisture Protection: Roofing, roof insulation, flashing, and trim requirements.
 - 3. Division 23 - Mechanical (HVAC) for Section related to roof mounted equipment.

1.2 REFERENCE STANDARDS

- A. ASTM International (ASTM):
 - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Provide roof deck structural framing as needed to support and anchor roof accessories.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Submit detailed drawings indicating construction interface of roof accessories with adjacent work and materials, and layout developed for this project. For equipment supports, indicate the specific equipment being supported. Show configurations, dimensioned locations and number for each type of roof accessory.
 - 1. Equipment Curbs and Rails: Submit shop drawings sealed and signed by a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store products under cover and elevated above grade.

1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide five (5) year warranty to correct defective work.
- C. Provide five (5) year manufacturer's warranty for materials and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

- A. Manufactured Curbs, Equipment Rails, and Other Roof Mounting Assemblies: Factory-assembled hollow sheet metal construction with fully mitered and welded corners, integral counterflashing, internal reinforcing, and top side and edges formed to shed water.
 - 1. Sheet Metal: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33 ksi; G90 (Z275) coating designation; 18 gage (0.048 inch) thick. Use thicker gage as required to support loads of equipment.
 - 2. Manufacture curb bottom and mounting flanges for installation on substrate construction as indicated on Drawings. Curb unit bottom to match slope of substrate and curb unit top to be horizontal for equipment mounting.
 - 3. Provide curbs with layouts and configurations as required by equipment being supported and as indicated on Drawings.
 - 4. Provide for anchorage requirements of the equipment to be supported.
 - 5. Provide unit insulated as indicated on Drawings.
 - 6. Height Above Finished Roof Surface: 9 inches, minimum. Total curb unit height varies based on roofing system thickness and slope of substrate.
- B. mounting.
 - 1. Provide preservative treated wood nailers along top of rails.
 - 2. Height Above Finished Roof Surface: 9 inches, minimum.
- C. Piping and Conduit Pedestals: Support devise sized to fit the diameter of the pipe being supported with stainless steel straps and stainless steel screws to secure strap to support and height adjustable.
 - 1. Manufacturers:
 - a. Olympic Olyflow PipeGuard.
 - b. Erico Caddy Pyramid EZ Series.
 - c. Portable Pipe Hangers.
 - d. Miro Industries.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Do not begin installation until substrate construction is as required.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Clean surfaces thoroughly prior to installation.

- D. 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. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install in accordance with manufacturer's instructions, in manner that maintains roofing weathertight integrity.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean installed work to like-new condition.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed products until completion of project.

END OF SECTION

SECTION 07 84 00**FIRESTOPPING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Firestopping through-penetrations of fire rated assemblies.
 - 2. Firestopping joints in fire rated assemblies.
 - 3. Firestopping tops of fire rated walls.
 - 4. Smoke sealing at joints between floor slabs and exterior walls.
 - 5. Smoke sealing penetrations and joints of smoke partitions.
- B. Related Requirements:
 - 1. Section 04 05 03 - Masonry Mortaring and Grouting: Mortar used for firestopping.
 - 2. Section 09 21 16 - Gypsum Board Assemblies: Gypsum board fireproofing.
 - 3. Division 22: Plumbing work requiring firestopping.
 - 4. Division 23: HVAC work requiring firestopping.
 - 5. Division 26: Electrical work requiring firestopping.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
 - 3. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestops Systems; 2023a.
 - 4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015, Reapproval 2019.
- B. California Department of Public Health (CDPH):
 - 1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- C. Intertek Testing Services (ITS):
 - 1. ITS (DIR) - Directory of Listed Products; Current Edition.
- D. Underwriters Laboratories Inc. (UL):
 - 1. UL (FRD) - Fire Resistance Directory; Current Edition.
 - 2. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including all Revisions.
 - 3. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including all Revisions.
 - 4. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including all Revisions.

1.3 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on product characteristics, performance, and limitation criteria.
- C. Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Manufacturer's Installation Instructions: Submit preparation and installation instructions.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- F. Engineering Judgements: For conditions not covered by UL (FRD) or ITS (DIR) listed designs, submit judgements by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

1.5 QUALITY ASSURANCE

- A. All firestopping on the project to be performed by the same Company.
- B. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gauge minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
 - 2. Floor Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - a. Floor Penetrations Within Wall Cavities: T-Rating is not required.
- C. Through Penetration Firestopping of Non-Fire Rated Floor Assemblies: Materials to resist free passage of flame and products of combustion.
 - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
 - 2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- D. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
 - 1. Smoke Barrier Joints Air Leakage: Maximum 5.0 cfm/sq ft of door opening at 0.30 inch water gauge pressure differential.
- E. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gauge minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- F. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three (3) years documented experience and approved by manufacturer.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of work.
- B. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- C. Maintain this minimum temperature before, during, and for minimum three (3) days after installation of materials.
- D. Provide ventilation in areas to receive solvent cured materials.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Conform to UL (FRD) or ITS (DIR) for fire resistance ratings and surface burning characteristics.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

2.2 FIRESTOPPING

- A. Manufacturers:
 - 1. 3M Fire Protection Products
 - 2. A/D Fire Protection Systems, Inc.
 - 3. Hilti Corp.
 - 4. Nelson Firestop Products
 - 5. Specified Technologies
 - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
 - 1. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
 - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
 - 2. Fiber Stuffing and Sealant Firestopping: Composite of mineral fiber stuffing insulation with silicone elastomer for smoke stopping.
 - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
 - 3. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
 - 4. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
 - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
 - 5. Firestop Pillows: Formed mineral fiber pillows.

2.3 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.

1. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
- B. Dam Material: Permanent; mineral fiber matting.
- C. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify openings are ready to receive firestopping.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- D. Remove incompatible materials affecting bond.
- E. Install damming materials to arrest liquid material leakage.

3.3 APPLICATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit, and other items, requiring firestopping.
- C. Apply primer as recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- D. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- E. Compress fibered material to maximum 40 percent of its uncompressed size.
- F. Install fire-rated cable management/firestopping products at locations as indicated on the Drawings or any location where low-voltage cable penetrates a fire rated partition.
- G. Dam material to remain.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Inspect installed firestopping for compliance with specifications and submitted schedule.
- C. Install descriptive label at all penetrations including UL assembly and verify noted UL assembly is consistent with installation.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean adjacent surfaces of firestopping materials.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 90 00
JOINT PROTECTION

PART 1 GENERAL**1.1 SUMMARY**

- A. Section includes joint sealants and accessories.
- B. Related Sections:
 - 1. Section 07 84 00 - Firestopping: Firestopping sealants.
 - 2. Section 08 80 00 - Glazing: Glazing sealants and accessories.
 - 3. Section 09 21 16 - Gypsum Board Assemblies: Acoustic sealant.
 - 4. Section 09 30 00 - Tiling: Sealant used as tile grout.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015, Reapproval 2022.
 - 2. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle); 2022.
 - 3. ASTM C736 - Standard Test Method for Extension-Recovery and Adhesion of Latex Sealants; 2012, Reapproval 2022.
 - 4. ASTM C834 - Standard Specification for Latex Sealants; 2017, Reapproval 2023.
 - 5. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
 - 6. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016, Reapproval 2023.
 - 7. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.
 - 8. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.
 - 9. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension; 2016, Reapproval 2021.
 - 10. ASTM D2202 - Standard Test Method for Slump of Sealants; 2000, Reapproval 2019.
 - 11. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 12. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
 - 13. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Changes 2021.
- B. California Department of Public Health (CDPH):
 - 1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with other Sections referencing this Section.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Shop Drawings: Submit schedule of sealant products to be installed and drawings indicating application locations of each sealant product.
- D. Samples for Initial Selection: Submit two (2) sets of samples of manufacturer's full and custom range of colors and finishes for each joint sealant product indicated for Architect's initial selection.
- E. Samples for Verification: Acquire Architect's direction to provide one of the following from Architect's initial selection:
 - 1. Submit two samples, 6 inches long, illustrating profile, dimension, color, and finish.
 - 2. Install Mockup samples of three (3) different shades of each sealant at each variation of construction type to be sealed for Architect to make selection verifications. Mockup locations to be as directed by Architect.
 - a. This Mockup requirement is for sealants that will remain visible and without paint or coating.
- F. Installation Plan: Resubmit shop drawings with added information. Indicate locations of sealant colors and finishes in compliance with Architect's verification of samples decisions.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- J. Indoor Air Quality Certificates:
 - 1. Certify volatile organic compound content for each interior sealant and related primer.
- K. Warranty Sample: As specified in this Section.

1.5 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five (5) years documented experience manufacturing products indicated in this Section.
- B. Installer Qualifications: Company specializing in performing the Work of this Section and with at least three (3) years documented experience installing the Work of this Section.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties and product bonds.
- B. Warranty: Provide warranty in which sealant manufacturer agrees to correct installed sealant work that fails. Failures include sealants that do not cure, fail to maintain seal including watertightness, exhibit loss of adhesion or cohesion, or staining of sealed substrate. Warranty period indicated is to begin on the date of Substantial Completion.
 - 1. Warranty Period:
 - a. Five (5) years.

PART 2 PRODUCTS

2.1 JOINT SEALANTS - GENERAL

- A. Fire-Rated Construction Elements and Assemblies: Provide only products that comply with requirements indicated on Drawings and comply with Authorities Having Jurisdiction.
- B. Comply with requirements indicated on Drawings and other specification Sections.
- C. Exterior Joints:
 - 1. Seal open joints except open joints indicated on Drawings as not sealed.
 - 2. Seal the following joints:
 - a. Wall expansion and control joints.
 - b. Joints between doors, windows, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - 3. Do not seal intentional weep holes in masonry or opening frames.
- D. Interior Joints:
 - 1. Do not seal interior joints indicated on Drawings as not sealed.
 - 2. Do not seal gaps and openings at junction of suspended ceilings to vertical construction unless indicated to be sealed on Drawings or as fire-rating, smoke, or sound control requirements.
 - 3. Seal open joints except specific open joints indicated on Drawings as not sealed.
 - 4. Seal the following joints:
 - a. Opening Frames: Joints as junction of doors, windows, and access frames to other construction.
 - b. Sound and Smoke Control Wall and Ceiling Assemblies:
 - 1) Gaps at electrical outlets, wiring devices, and piping penetrations.
 - 2) Joints at junction to other construction.
- E. ASTM reference designations for joint sealant Types, Grades, Classes, and Uses:
 - 1. ASTM C920, Type S: Single component.
 - 2. ASTM C920, Type M: Multi-components.
 - 3. ASTM C920, Grade P: Pourable.
 - 4. ASTM C920, Grade NS: Non-sag.
 - 5. ASTM C920, Exposure Use T: Traffic.
 - 6. ASTM C920, Exposure Use NT: Non-traffic.
 - 7. ASTM C920, Substrate Use G: Glass.
 - 8. ASTM C920, Substrate Use M: Mortars.
 - 9. ASTM C920, Substrate Use A: Aluminum.
 - 10. ASTM C920, Substrate Use O: Other.
 - 11. ASTM C920, Class XX: Movement capability, percent (single value used when expansion and contraction are equal).
 - 12. ASTM C920, Class XX/YY: Movement capability, percent (expansion / contraction).
 - 13. ASTM C834, Type OP: Opaque.
 - 14. ASTM C834, Grade: Temperature Rating.

2.2 NON-SAG JOINT SEALANTS

- A. Type JSS-1: Silicone Joint Sealant, single-component, non-sag, neutral-curing, ASTM C920, Type S, Grade NS, Class 100/50, Use T, NT, G, M, A, and O.
 - 1. Manufacturers: Products are to comply with requirements.
 - a. Dow Chemical Company.
 - b. Pecora Corporation.
 - c. Tremco Incorporated.
 - 2. Basis of Design: Dow Chemical Company - DOWSIL 790.

3. Joint Movement Capability: Plus 100 and minus 50, ASTM C719.
 4. Hardness: 15, Shore A, ASTM C661.
 5. Staining: None on brick, concrete, granite, and limestone.
 6. VOC Content: 26 g/L maximum.
 7. Color:
 - a. To be selected by Architect from manufacturer's full range.
 8. Applications: Locations where field painting is not required.
 - a. Exterior: Control, expansion, and soft joints in masonry, and between masonry and adjacent work.
 - b. Exterior: Control, expansion, and construction joints in vertical cast-in-place concrete.
 - c. Exterior: Joints between metal frames and non-masonry work.
 - d. Exterior: Joints within framing of aluminum storefront, curtain wall, and window systems.
- B. Type JSS-2: Silicone Joint Sealant, single-component, non-sag, neutral-curing, ASTM C920, Type S, Grade NS, Class 50/50, Use NT, G, A, and O.
1. Manufacturers: Products are to comply with requirements.
 - a. Dow Chemical Company.
 - b. Pecora Corporation.
 - c. Tremco Incorporated.
 2. Basis of Design:
 - a. Dow - DOWSIL 795.
 3. SWRI Validation certified.
 4. Joint Movement Capability: Plus and minus 50, ASTM C719.
 5. Hardness: 30 - 35, Shore A, ASTM C661.
 6. Peel Strength: 30 - 32 lb/in, ASTM C794.
 7. Staining: None on brick, concrete, granite, marble, and limestone.
 8. VOC Content: 32 g/L maximum.
 9. Color:
 - a. To be selected by Architect from manufacturer's full range.
 10. Applications: Locations where field painting is not required.
 - a. Exterior: Lap joints in sheet metal work.
 - b. Exterior: Joints between metal frames and non-masonry work.
 - c. Exterior: Joints within exterior insulation finish systems (EIFS).
 - d. Exterior: Joints for which no other sealant type is indicated.
- C. Type JSS-3: Silicone Joint Sealant, mildew resistant, single-component, non-sag, neutral-curing, ASTM C920, Type S, Grade NS, Class 50/50 or 25/25, Use NT, G, M, and A.
1. Manufacturers: Products are to comply with requirements.
 - a. Dow Chemical Company.
 - b. Pecora Corporation.
 - c. Sika Corporation.
 - d. Tremco Incorporated.
 2. Basis of Design:
 - a. Pecora - 898NST.
 3. Mold and mildew resistant.
 4. Non-corrosive to copper, brass, and zinc allows.
 5. Fungi Resistance: No growth (less than 2 ug), ASTM G21.
 6. Joint Movement Capability: Plus and minus 50 or 25, ASTM C719.
 7. Hardness: 25 - 35, Shore A, ASTM C661.
 8. Peel Strength: Pass for glass, white marble, granite, and fiberglass, ASTM C794.
 9. Staining: None on granite and marble.
 10. VOC Content: 50 g/L maximum.

11. Color:
 - a. To be selected by Architect from manufacturer's full range.
 12. Applications: Locations where field painting is not required.
 - a. Interior: Joints between wet area fixtures and floors, walls, and ceilings.
 - b. Interior: Joints at through wall plumbing penetrations.
- D. Type JSL-1: Siliconized Acrylic Latex Joint Sealant, single-component, non-sag, non-staining, nonbleeding, ASTM C834, Grade OP, Grade -18 Degrees F.
1. Manufacturers: Products are to comply with requirements.
 - a. Pecora Corporation.
 - b. Sika - Master Builders Solutions.
 - c. Tremco Incorporated.
 2. Basis of Design:
 - a. Sika - MasterSeal NP 520.
 3. Overcoat: Paintable.
 4. Elongation at Break: 169 percent, ASTM D412.
 5. Recovery: 91.3 percent, ASTM C736.
 6. Slump: 0 (zero) inch, ASTM D2202.
 7. Tensile Strength: 203 psi, ASTM D412.
 8. Fire Spread / Smoke Development Index: 10/5, ASTM E84.
 9. Sound Transmission Class (STC): 58 db, ASTM E90.
 10. VOC Content: 13 g/L maximum.
 11. Color:
 - a. To be selected by Architect from manufacturer's full range.
 12. Applications: Locations where field painting of substrates is required on both sides of joint unless indicated otherwise on Drawings.
 - a. Interior: Joints of painted wood.
 - b. Interior: Joints of painted gypsum wallboard construction.
 - c. Interior: Acoustic sealant in concealed applications.
 - d. Interior: Joints of painted substrates for which no other sealant is indicated.
- E. Type JSU-1: Polyurethane Elastomeric Joint Sealant, single-component, non-sag, moisture-curing, ASTM C920, Type S, Grade NS, Class 35/35, Use T, NT, M, A, and O.
1. Manufacturers: Products are to comply with requirements.
 - a. Pecora Corporation.
 - b. Sika USA.
 - c. Tremco Incorporated.
 2. Basis of Design: Sika - Sikaflex-1A.
 3. SWRI Validation certified.
 4. Overcoat: Paintable.
 5. Joint Movement Capability: Plus and minus 35, ASTM C719.
 6. Hardness: 25 - 45 Shore A, ASTM C661.
 7. Peel Strength: 20 lb/in, ASTM C794.
 8. Tensile Strength: 175 psi at 21 days, ASTM D412.
 9. Elongation: 550 percent, ASTM D412.
 10. Service Temperature: Minus 40 to 170 degrees F.
 11. VOC Content: 37 g/L maximum, ASTM D3960.
 12. Color:
 - a. To be selected by Architect from manufacturer's full range.
 13. Applications: Locations where field painting of substrates is required on both sides of joint unless indicated otherwise on Drawings.
 - a. Interior: Joints in concrete and concrete panels.
 - b. Interior: Joints on underside of concrete planks and panels.
 - c. Interior: Joints in unit masonry.

- d. Interior: Joints between metal frames and adjacent construction.
- e. Interior: Traffic joints in floors and at junction of floors to walls.

2.3 SELF-LEVELING JOINT SEALANTS

- A. Type JSS-3: Self-Leveling Silicone Joint Sealant, single-component, neutral-curing, ASTM C920, Type S, Grade P, Class 100/50, Use T, M, A, and O.
 - 1. Manufacturers: Products are to comply with requirements.
 - a. Dow Chemical Company.
 - b. Pecora Corporation.
 - c. Tremco Incorporated.
 - 2. Basis of Design:
 - a. Pecora - 300 SL (Self-Leveling).
 - 3. Joint Movement Capability: Plus 100 and minus 50, ASTM C719.
 - 4. Hardness: 15, Shore A, ASTM C661.
 - 5. Elongation at Break: 1,400 percent, ASTM D412.
 - 6. Service Temperature: Minus 40 to 180 degrees F.
 - 7. Color:
 - a. To be selected by Architect from manufacturer's full range.
 - 8. Applications: Locations where field painting is not required.
 - a. Exterior: Control, construction, and expansion joints in concrete paving and between concrete and asphalt paving.

2.4 ACCESSORIES

- A. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- C. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specified sealant, 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.
- D. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- E. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate surfaces and joint openings are as required and ready to receive work.
- C. Verify that accessories are as required by sealant manufacturer and are compatible with sealant and application surfaces.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section. Prepare materials to be installed and equipment used during installation.
- B. Remove loose materials and foreign matter impairing adhesion of sealant.
- C. Clean and prime joints.
- D. Perform preparation in accordance with ASTM C1193.
- E. Protect elements surrounding Work of this Section from damage or disfiguration.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Perform installation in accordance with ASTM C1193.
- C. 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.
- D. Apply masking tape to protect adjacent surfaces and to form uniform sealant edge.
- E. Install bond breaker backing tape where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces or other construction.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool sealant surface concave, unless otherwise indicated and remove masking tape at appropriate time to form uniform sealant edge and as to not mar substrate beneath.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect sealants until cured.

END OF SECTION

SECTION 07 95 13
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL**1.1 SUMMARY**

- A. Section includes expansion joint cover assemblies for floor, wall and ceiling surfaces.
- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry: Execution requirements for placement of joint assembly frames specified in this Section in masonry.
 - 2. Section 07 90 00 - Joint Protection: Expansion and control joint finishing utilizing sealant and bond breaker.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
 - 2. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
 - 3. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.
- B. Intertek Testing Services (ITS):
 - 1. ITS (DIR) - Directory of Listed Products; Current Edition.
- C. Underwriters Laboratories Inc. (UL):
 - 1. UL (Dir) - Online Certifications Directory; Current Edition.
 - 2. UL (FDR) - Fire Resistance Directory; Current Edition.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data: Submit joint assembly profiles, profile dimensions, anchorage devices, and manufacturer's full range and custom range of colors and finishes.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of work, affected adjacent construction, and anchorage locations.
- D. Samples for Initial Selection: Submit two samples of manufacturer's full range of colors and finishes for Architect's initial selection.
 - 1. For Exterior Wall Applications: Allow for custom color selection by Architect.
- E. Samples for Verification: Submit two samples 6 inches long, illustrating profile, dimension, color, and finish selected from Architect's initial selection.
 - 1. For Exterior Wall Applications: Allow for custom color selection by Architect.
- F. Manufacturer's Installation Instructions: Submit rough-in sizes; provide templates for cast-in or placed frames or anchors; required tolerances for item placement.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Expansion Joint Cover Assemblies:
 - 1. Architectural Art Mfg., Inc.
 - 2. Balco, Inc.
 - 3. Watson Bowman Acme Corporation.
 - 4. Construction Specialties, Inc.
 - 5. MM Systems Corporation.
 - 6. Nystrom, Inc.
- B. Basis of Design: MM System Corporation.

2.2 APPLICATIONS

- A. Colors to be as selected by Architect from manufacturer's full range, unless indicated otherwise.
- B. Interior Joints:
 - 1. Floor to Floor Joints: [Flushline System FSS Series](#).
 - 2. Wall to Wall Masonry Joints: [ESS Series](#).
 - 3. Wall to Wall Masonry Corner Joints: [ESS Series](#).
 - 4. Wall to GWB Ceiling Joints: [VSGL Series](#).
 - 5. Wall to Acoustic Ceiling Joints: [VSGL Series](#).
 - 6. Inline Acoustic Ceiling Joints: [VSG Series](#).
- C. Exterior Joints:
 - 1. Wall to Wall Masonry Joints: [ESS Series](#).
 - 2. Wall to Wall Masonry Corner Joints: [ESS Series](#).
- D. Fire Rated Expansion and Seismic Joints: [Pyro-Flex Fire Barrier](#).
 - 1. Provide cover assembly labled to have fire rating equivalent to that required for constructed joint.
 - a. Acceptable Evaluation Agencies: UL, ULC, and Intertek.

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. Joint Cover Styles: As indicated in the Applications Article of this Section and as indicated on Drawings.
 - 4. Joint Movement Capability: If not indicated, provide minimum plus/minus 50 percent joint movement capability.
 - 5. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 - 6. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Floor Joint Covers: Coordinate with indicated floor coverings.
 - 1. If floor covering is not indicated, obtain instructions from Architect before proceeding.
 - 2. If style is not indicated, provide extruded aluminum frame both sides, resilient seals, and minimize exposed metal.

- C. Sliding Cover Plate Type Covers: Provide plate with beveled edges and neat fit that does not collect dirt.
- D. Covers In Fire Rated Assemblies: Provide cover assembly labeled to have fire rating equivalent to that required for constructed joint.
 - 1. Acceptable Evaluation Agencies: UL, ULC, and Intertek.

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
 - 1. Colors: As selected by Architect from manufacturer's full range of finishes.
- B. Anchors and Fasteners:
 - 1. Exterior Applications: Stainless steel as recommended by cover manufacturer.
 - 2. Interior Applications at Cementitious Substrates: Stainless steel as recommended by cover manufacturer.
 - 3. Interior Applications at Non-Cementitious Substrates: As recommended by cover manufacturer.
- C. Backing Paint: Asphaltic type.
- D. Sealant: Silicone, color to match preformed expansion joint color.

2.5 FABRICATION

- A. Joint Covers: Aluminum cover plate, designed to permit plus or minus 50 percent joint movement with full recovery, surface mounted.
- B. Back paint components in contact with cementitious materials or dissimilar metals.
- C. Shop assemble components and package with anchors and fittings.
- D. Furnish joint components in single continuous length wherever practical. Minimize site splicing.

2.6 FACTORY FINISHING

- A. As selected by Architect from manufacturer's full range of finishes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine substrates for conditions detrimental to installation of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.
- D. Verify that joint sealant system has been installed before application of rigid joint cover assembly.
- E. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Provide anchoring devices for installation and embedding.
- D. Provide templates and rough-in measurements.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install components and accessories in accordance with manufacturer's instructions.
- C. Align materials and cover assemblies as indicated on the Drawings.
- D. Align work plumb and level, flush with adjacent surfaces.
- E. Rigidly anchor to substrate to prevent misalignment.
- F. Where indicated, apply field sealant to exterior joint material, both sides of joint.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. 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 SUMMARY

- A. Section Includes:
 - 1. Non-fire-rated hollow metal doors and frames.
 - 2. Fire-rated hollow metal doors and frames.
 - 3. Hollow metal frames for wood doors and door types other than steel doors.
 - 4. Hollow metal borrowed lites glazing frames.
- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry: Wall construction type. Masonry grout fill of metal frames and placement of anchors into masonry wall construction.
 - 2. Section 08 14 16 - Flush Wood Doors: Wood doors for metal frames.
 - 3. Section 08 71 00 - Door Hardware: Hardware, silencers, and weatherstripping.
 - 4. Section 08 80 00 - Glazing: Glass for doors and lite frames.
 - 5. Section 09 21 16 - Gypsum Board Assemblies: Wall construction type.
 - 6. Section 09 90 00 - Painting and Coating: Field painting.

1.2 REFERENCES

- A. Americans With Disabilities Act (ADA):
 - 1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; Current Edition.
- B. American National Standards Institute (ANSI) and Steel Door Institute (SDI):
 - 1. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2022.
 - 2. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2020.
 - 3. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames; 2023.
 - 4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- C. ASTM International (ASTM):
 - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
 - 2. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2019.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023b.
- D. International Code Council (ICC):
 - 1. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- E. Intertek Testing Services (ITS):
 - 1. ITS (DIR) - Directory of Listed Products; Current Edition.
- F. National Fire Protection Association (NFPA):
 - 1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives: 2022.
 - 2. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

3. NFPA 105 - Standard for Smoke Door Assemblies and other Opening Protectives; 2022.
 4. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
 5. NFPA 257 - Standard On Fire Test For Window And Glass Block Assemblies; 2022.
- G. Steel Door Institute (SDI):
1. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.
- H. Underwriters Laboratories Inc. (UL):
1. UL (DIR) - Online Certifications Directory; Current Edition.
 2. UL 9 - Standard for Safety Fire Tests of Window Assemblies; Current Edition, Including All Revisions.
 3. UL 10B - Standard for Safety Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
 4. UL 10C - Standard for Safety Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
 5. UL 1784 - Standard for Safety Air Leakage Tests of Door Assemblies and Other Opening Protectives; Current Edition, Including All Revisions.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate fire rating of metal frames to fire rating requirements of doors and wall construction for compliance with overall fire rated separation requirements.
- C. Coordinate Work with the requirements of frame and door opening construction, door hardware, and glazing.
- D. Coordinate frames to accommodate various glazing types, door types and hardware requirements as indicated in the Drawings and other specification sections.
- E. Coordinate door frames and anchors with adjacent wall construction which may include, but not be limited to, masonry and framed wall construction with various finish types.
- F. Coordinate fabrication of doors and frames to include factory installed steel plate reinforcing for required hardware devices as indicated in this Section and in Section 08 71 00 for each door and frame. Reinforcing to comply with ANSI/SDI A250.8 and ANSI/SDI A250.6.
- G. Coordinate fabrications and sequence installation to accommodate required door hardware electric wire connections.

1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene at project site minimum one week prior to commencing work of this section.
- C. Require attendance of Architect, Owner, Owner's Locksmith and installers of doors, frames, hardware, access control systems, electrical and walls.
- D. Review specification section and cited standards for this Work and Work of related installers; verify submittal approvals and outstanding issues; verify qualifications including qualifications of Contractor's inspectors.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit manufacturer's product data describing products and components. Include sample of each warranty specified.

- C. Shop Drawings: Indicate materials and details of design and construction; hardware locations; reinforcement type and locations; anchor types, spacing, locations and fastening methods; door and frame elevations and assemblies; glazing; fire rating; smoke and draft control; and finishes.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- B. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this section with at least five (5) years documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three (3) years documented experience.
- D. Maintain at project site copies of reference standards relating to installation of products specified.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept frames and doors on site in manufacturer's packaging. Inspect for damage.
- C. Comply with manufacturer's recommendation and ANSI/SDI A250.8 in accordance with specified requirements.
- D. Protect with resilient packaging; prevent against humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish manufacturer's five (5) year warranty for fire rated and for smoke and draft control assemblies.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door - Assa Abloy.
 - 2. Curries - Assa Abloy.
 - 3. Fleming Door Products - Allegion.
 - 4. Pioneer Industries.
 - 5. Republic Doors - Allegion.
 - 6. Steelcraft - Allegion.

7. Substitutions: Section 01 60 00 - Product Requirements.

2.2 REGULATORY REQUIREMENTS

- A. Regulatory requirements in this Article are minimum requirements, unless requirements by authorities having jurisdiction are more stringent. Comply with the most stringent requirements.
- B. Fire Rated Assemblies:
 1. Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated.
 2. Fire Rating: As indicated on Drawings, tested in accordance with UL 10C and NFPA 252 (positive pressure fire tests).
 3. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - a. Attach fire rating label to each fire rated unit.
 4. Temperature-Rise Rating (TRR) Across Framed Door Thickness: In accordance with local building code and authorities having jurisdiction.
- C. Smoke and Draft Control Assemblies:
 1. Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction.
 2. Locations as indicated on Drawings.
 3. Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire rated doors, and as follows:
 - a. Maximum Air Leakage: 3.0 cfm/sq ft (0.02 cu m/sec/sq m) of door opening at 0.10 inch w.g. (24.9 Pa) pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
 - b. Gasketing: Provide gasketing and edge sealing as necessary to achieve leakage limit.
 - c. Label: Include the "S" label on fire-rating label of door.
- D. Fire Rated, Borrowed-Lite Assemblies:
 1. Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire protection ratings.
 2. Fire Rating: As indicated on Drawings, tested in accordance with UL 9 and NFPA 257.
- E. Accessibility: Comply with ICC A117.1 and ADA Standards.

2.3 HOLLOW METAL DOORS AND FRAMES

- A. Standard and custom shop fabricated hollow metal doors and frames; fire rated and smoke and draft control assemblies; refer to Drawings and this Section for sizes and configurations.
- B. Finish for doors and frames:
 1. Factory primed and field finished. Refer to 09 90 00 - Coating and Painting for field finish.
- C. Interior Doors: ANSI/SDI A250.8, 1-3/4 inch thick.
 1. Level 3 - Extra Heavy Duty; door face 0.053 inch (16 gauge) thick steel, minimum.
 2. Model 2 (seamless), unless indicated otherwise on Drawings.
 3. Physical Performance: Level A (1,000,000 cycles), in accordance with ANSI/SDI A250.4.
 4. Door Face Sheet: Flush.
 5. Door Core:

- a. Manufacturer's standard core material/construction and in compliance with requirements.
 6. End Closures: Steel channel type; 0.042 inch thick; flush with door faces and edges.
 7. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- D. Interior Frames: ANSI/SDI A250.8.
1. Level 3 - Extra Heavy Duty; 0.053 inch (16 gauge) thick steel, minimum.
 2. Wrap around frame. Coordinate with wall thickness.
 3. Joinery of Frame Members:
 - a. Full profile continuously welded type.
 4. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- E. Exterior Doors: ANSI/SDI A250.8, 1-3/4 inch thick.
1. Level 4 - Maximum Duty; door face 0.067 inch (14 gauge) thick steel, minimum.
 - a. Zinc Coating: A60/ZF180 (galvannealed), ASTM A653/A653M.
 2. Model 2 (seamless), unless indicated otherwise on Drawings.
 3. Physical Performance: Level A (1,000,000 cycles), in accordance with ANSI/SDI A250.4.
 4. Door Face Sheet: Flush.
 5. Door Core:
 - a. Manufacturer's standard core material/construction and in compliance with requirements.
 6. Thermal Resistance Rating: For doors and frames separating conditioned air space and unconditioned air space, provide door and frame assembly with R-value of not less than 2.4 deg F x h x sq. ft./BTU when tested in accordance with ASTM C1363.
 7. End Closures: Steel channel type; 0.042 inch thick; flush with door faces and edges.
 - a. Provide weep hole openings in bottoms to permit moisture to escape to exterior. Seal joints in top edges of doors against water penetration.
 8. Weatherstripping: Refer to Section 08 71 00.
 9. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- F. Exterior Frames: ANSI/SDI A250.8.
1. Level 4 - Maximum Duty; 0.067 inch (14 gauge) thick steel, minimum.
 - a. Zinc Coating: A60/ZF180 (galvannealed), ASTM A653/A653M.
 2. Wrap around frame. Coordinate with wall thickness.
 3. Joinery of Frame Members:
 - a. Full profile continuously welded type.
 4. Weatherstripping: Refer to Section 08 71 00.
 5. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- G. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on Drawings. Non-removable stops on non-secured side of frame.

2.4 ACCESSORIES

- A. Louvers: Roll formed steel with overlapping frame; steel coating and finish same as door components; factory installed.
1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
 2. Style: Standard straight slat blade, unless indicated otherwise on Drawings.
 3. Louver Free Area: Comply with air flow requirements.
 4. Fasteners: Concealed fasteners.

- B. Glazing: As specified in Section 08 80 00 - Glazing; factory installed.
- C. Removable Glazing Stops: Rolled steel channel shape, mitered, or butted corners; prepared for countersink type screw holes and screws.
- D. Frame Anchors:
 - 1. Masonry Walls: Masonry strap type; three holes in strap; galvanized.
 - 2. Metal Stud Walls: Steel stud channel type.
 - 3. Base Anchor: Fixed base type.
- E. Astragals for Double Doors: Comply with requirements of door operation and fire rating and smoke and draft control.
- F. Hollow Metal Fixed Panels: If indicated on Drawings, provide panels of same construction, performance, and finish as doors.
- G. Silencers: Specified in Section 08 71 00.
- H. Weatherstripping: Specified in Section 08 71 00.

2.5 FABRICATION

- A. Fabricate doors and frames to comply with fire rating and smoke and draft control indicated on Drawings.
- B. Fabricate doors and frames with hardware reinforcement welded in place. Comply with ANSI/SDI A250.8 and ANSI/SDI A250.6. Protect frame hardware preparations with mortar guard boxes.
- C. Fabricate frames to accommodate various glazing types, door types and hardware requirements as indicated in the Drawings and other specification sections.
- D. Fabricate frames and anchors to suit indicated adjacent wall and floor construction which may include, but not be limited to, concrete, masonry, and framed wall construction with indicated finish types.
- E. Fabricate frames to suit masonry wall coursing with head member height as required to fill opening without cutting masonry units.
- F. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- G. Prepare interior frames for silencers or other seal devices for achieving fire rating and smoke and draft control requirements.
- H. Kerfed Frames: Provide kerfed-style frames where required by door seal hardware such as smoke gasketing, sound gasketing or weatherstripping.
- I. Frame Silencers and Weatherstripping:
 - 1. Interior Frames: Prepare frames for silencers. Provide three single silencers for single doors on strike side. Provide two single silencers on frame head at double doors without mullions.
 - 2. Exterior Frames: Configure exterior frames with profile to receive recessed weatherstripping.
- J. Frame Mullions for Double Doors: Removable type, with profile matching jambs.
- K. Frame Transom Bars for Glazed Lights: Fixed type, integral with adjacent frame construction and with profile matching jamb and head.
- L. Attach fire rating label to each fire rated door and frame.
- M. Attach label to each hollow metal door and frame indicating A-60 Galvannealed.

2.6 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A653/A653M, A60.
- B. Primer: Baked. ANSI A250.10 rust inhibitive type.
- C. Bituminous Coating: Fibered asphalt emulsion. Coating inside of frames to be set in masonry walls or otherwise grouted solid with cementitious grout. Apply coating after fabrication and after primer has cured.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify existing conditions before starting work.
- C. Verify opening sizes and tolerances are acceptable.
- D. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3 INSTALLATION

- A. Install doors and frames in accordance with ANSI/SDI A250.8.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate installation of doors and frames with indicated types of doors, electrical connections, hardware, and glazing panels that are specific to each opening as indicated on the Drawings and in the Specifications.
- D. Install door hardware as specified in Section 08 71 00.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.8 and ANSI/SDI A250.6.
- E. Coordinate installation of door frames and anchors with indicated adjacent wall and floor construction which may include, but not be limited to, concrete, masonry, and framed wall construction with indicated finish types.
- F. Grout solid, frames in masonry construction. Prior to grouting, provide bracing sufficient so that pressure of grout will not deform frames.
- G. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- H. Comply with glass and glazing installation requirements in Section 08 80 00.
- I. Adjust door for smooth and balanced door movement and latching.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.

- B. Comply with tolerances and clearances indicated in SDI 117.
- C. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

3.5 SCHEDULE

- A. Refer to Door and Frame Schedule on Drawings.

END OF SECTION

SECTION 08 11 16.10
ALUMINUM DOORS WITH FRP FACE PANEL

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes aluminum doors with fiberglass reinforced plastic (FRP) face panels.
- B. Related Requirements:
 - 1. Section 07 90 00 - Joint Protection: Frame perimeter sealants.
 - 2. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Frames requiring FRP faced doors.
 - 3. Section 08 44 13 - Glazed Aluminum Curtain Walls: Frames requiring FRP faced doors.
 - 4. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
 - 5. Section 08 80 00 - Glazing.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
 - 2. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
 - 3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. ASTM International (ASTM):
 - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 4. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014, Reapproval 2021.
 - 5. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2023.

1.3 SYSTEM DESCRIPTION

- A. Aluminum framed entrance system with aluminum doors faced with fiber reinforced polyester faces.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.

- C. Product Data: Submit component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- D. Samples for Initial Selection: Two manufacturer's complete set of color samples illustrating the full range of finishes and colors available. Include samples for FRP surfaces, aluminum frame finishes, glass units, infill panels, glazing materials. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 8 x 8 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish ten (10) year manufacturer's warranty for doors and frames systems.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
 - 1. To design pressure of 6.24 lb/sq ft, as tested in accordance with ASTM E330/E330M.
- B. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- C. Water Leakage: None, when measured in accordance with ASTM E331 with test pressure difference of 20 percent of design pressure, with minimum differential of 2.86 lbf/sq ft and maximum of 12.00 lbf/sq ft.

2.2 ALUMINUM DOORS WITH FRP FACE PANEL

- A. Manufacturers:
 - 1. Eliason Corporation.
 - 2. Kawneer Co., Inc.

3. Oldcastle Building Envelope.
 4. Special-Lite, Inc.
 5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Flush Aluminum Doors with Fiberglass Reinforced Plastic (FRP) Face Sheets: Aluminum internal framing; no steel components.
1. Size: As indicated on Drawings.
 2. Thickness: 1-3/4 inches (44 mm).
 3. Stiles and Rails:
 - a. Stiles: As indicated on Drawings, but not less than 5-1/2 inches wide, reinforced minimum 3/16 inch thick.
 - b. Top and Bottom Rails: As indicated on Drawings, but not less than 6 inches wide, reinforced minimum 3/16 inch thick.
 4. Facing: Seamless, ultraviolet stabilized laminated FRP sheet.
 - a. Sheet Thickness: 0.12 inch (3 mm), minimum.
 - b. FRP Texture:
 - 1) Pebble grain.
 - c. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less; when tested in accordance with ASTM E84.
 - d. Color: To be selected by Architect from manufacturer's full range.
 5. Core Insulation: Poured-in-place polyurethane foam insulation of not less than 5 lb/cu ft (80 kg/cu m) density.
 6. Hardware Reinforcement: Provide minimum internal 3/16 inch steel reinforcement.
 7. Aluminum Finish and Color:
 - a. Match door frame finish and color.
- C. Hardware:
1. Coordinate with Section 08 71 00 - Door Hardware; provide door hardware for types of doors, applications, and hardware indicated:
 - a. Weatherstripping: Wool pile, continuous and replaceable.
 - b. Hinges: Continuous type, non-removable pin.
 - 1) Specified in Section 08 71 00.
 - c. Threshold: Extruded aluminum, one piece for each door opening, ribbed surface.
 - 1) Specified in Section 08 71 00
 - d. Panic Device: Specified in Section 08 71 00.
 - e. Closer: Specified in Section 08 71 00.
 - f. Lock Cylinders: Specified in Section 08 71 00.
 - g. Finish: Hardware finish to match door aluminum finish.
- D. Glazing Panels: Manufacturer's integral aluminum frame, factory gasket glazed, and allowing for thermal movement. requirements.
1. Interior Doors: 1/4 inch thick tempered glass.
 2. Exterior Doors: 1 inch thick insulated glazing unit; tempered glass.
 3. Refer to Section 08 80 00 - Glazing.
- E. Fasteners and Anchors: Stainless steel.

2.3 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. Arrange fasteners and attachments to conceal from view.
- E. Prepare components with heavy duty internal reinforcement for door hardware.
- F. Reinforce framing members for imposed loads.

2.4 ALUMINUM MATERIALS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical or 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine substrates for conditions detrimental to installation of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Examine products to be installed for damage and other conditions detrimental to completion of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Verify dimensions, tolerances, and method of attachment with other Work.
- E. Verify wall openings are ready to receive Work of this Section.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- 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.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- G. Set thresholds in bed of mastic and secure.
- H. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.
- I. Install infill panels using method required to achieve performance criteria.
- J. Coordinate installation of perimeter sealants with Section 07 90 00.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.5 ADJUSTING

- A. Section 01 73 00 - Execution: Adjusting requirements.
- B. Adjust door for smooth and balanced door movement and latching.

3.6 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work and comply with manufacturer's recommendations.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Flush wood doors.
- B. Related Requirements:
 - 1. Section 08 11 13 - Hollow Metal Doors and Frames: Metal frames for wood doors indicated to be installed in metal frame.
 - 2. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Aluminum frames for wood doors indicated to be installed in aluminum frame.
 - 3. Section 08 71 00 - Door Hardware.
 - 4. Section 08 80 00 - Glazing.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
 - 2. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- B. Architectural Woodwork Institute (AWI), Architectural Woodwork Manufacturers Association of Canada (AWMAC), Woodwork Institute (WI):
 - 1. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, Errata 2016.
- C. Architectural Woodwork Institute (AWI):
 - 1. AWI (QCP) - Quality Certification Program; Current Edition.
- D. California Air Resource Board (CARB):
 - 1. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; Current Edition.
- E. National Fire Protection Association (NFPA):
 - 1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
 - 2. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- F. Underwriters Laboratories Inc. (UL):
 - 1. UL (Dir) - Online Certifications Directory; Current Edition.
 - 2. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
 - 3. UL 1784 - Standard for Safety Air Leakage Tests of Door Assemblies and Other Opening Protectives; Current Edition, Including All Revisions.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Provide the necessary framing, blocking, and backing in walls and ceilings adequate for anchorage the Work.
- C. Coordinate Work with door opening construction, door frame and door hardware.

- D. Coordinate fire rating of metal frames to fire rating requirements of doors and wall construction for compliance with overall fire rated separation requirements.
- E. Coordinate frames with smoke and draft control doors to comply with overall assembly requirements.
- F. Coordinate frames with sound rated doors to comply with overall assembly requirements.

1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, project conditions, sequencing, application procedures, quality control, testing and inspection and production schedule.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type, and characteristics.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.
 - 1. Provide information as required by AWI/AWMAC/WI (AWS).
 - 2. Include AWI (QCP) certification program label and project registration identification.
- D. Samples for Initial Selection: Two sets of manufacturer's samples; each 2 x 4 inches; illustrating the full range of wood grains, stain colors and sheens available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare two samples for each selected finish, color, and sheen; on same product material type indicated for final Work; each 8 x 10 inches. Where finishes involve normal finish, color, sheen, and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit special installation instructions.
- G. Manufacturer's Qualifications Statement.
- H. Installer's Qualifications Statement.
- I. Specimen warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Warranties executed in Owner's name.
- B. AWI (QCP) - Quality Certification Program certificates.

1.7 QUALITY ASSURANCE

- A. Maintain one copy of the specified door quality standards on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with not less than five (5) years of documented experience.
 - 1. Accredited participant in AWI (QCP) - Quality Certification Program prior to commencement of fabrication and throughout the duration of the project.

- C. Installer Qualifications: Company specializing in performing work of the type specified in this Section, with not less than five (5) years of documented experience.
- D. Comply with AWI/AWMAC/WI (AWS) standards and grades indicated, unless otherwise specified or indicated.
 - 1. Grades indicated are minimum requirement. Where the Contract Documents indicate elements of the work requirements that exceed the minimum grade indicated, comply with the Contract Documents regarding that element of the work.
- E. Comply with AWI (QCP) - Quality Certification Program requirements.
 - 1. AWI (QCP) quality certification:
 - a. Register project and comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this Section.
 - b. Provide labels or certificates indicating that installed complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
 - c. Provide designated labels on shop drawings and installed products as required by certification program.
 - d. Submit certifications upon completion of installation that verifies the work complies with specified requirements.
- F. Attach labels from certifying agencies approved by authority having jurisdiction.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Package, deliver, and store doors in accordance with AWI/AWMAC/WI (AWS) standards, and door manufacturer requirements.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Environmental Limitations: Comply with AWI/AWMAC/WI (AWS) standards and as follows.
 - 1. Do not deliver or install doors until building space is enclosed and weathertight, wet work is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period. Allow minimum of 72 hours for delivered materials to acclimate to the climate controlled building space before beginning installation.

1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties and product bonds.
- B. Furnish manufacturer's "Life of Installation" warranty for interior doors, including hanging and finishing if door(s) do not comply with warranty tolerance standards.
 - 1. Include coverage for defective materials, delamination, warping, cupping, bowing, and telegraphing of core construction beyond specified installation tolerances.

1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 - 1. One (1) gallon of each type stain and finish coating system used to finish doors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Masonite International Architectural.
 - 2. Oshkosh Architectural Door Company.
 - 3. Oregon Door.
 - 4. VT Industries.
 - 5. Substitutions: Section 01 60 00 - Product Requirements.

2.2 FLUSH WOOD DOORS - INTERIOR

- A. Grade:
 - 1. Custom.
- B. Performance:
 - 1. Extra Heavy Duty.
- C. Door Size and Configuration:
 - 1. Thickness: 1-3/4 inches thick unless otherwise indicated on Drawings.
 - 2. Size: As indicated on Drawings.
 - 3. Glass Panel: As indicated on Drawings.
- D. Non-Rated and 20-min Rated Doors:
 - 1. Solid Core: Type PC-5, particleboard core, 5-ply.
- E. Fire Rated Doors: Tested to fire ratings indicated on Drawings in accordance with UL 10C-Positive Pressure; UL labeled without any visible seals when door is closed.
 - 1. Solid Core: Type FD-5 rating as scheduled; Category A for positive pressure fire test, 5-ply.
- F. Smoke and Draft Control Doors: Required as indicated on Drawings. In addition to required fire rating, provide door assemblies acceptable tested in accordance with UL 1784 and installed in accordance with NFPA 105 with maximum air leakage of 3.0 cfm per sq ft (0.01524 cu m/s/sq m) of door opening at 0.10 inch wg (24.9 Pa) pressure at both ambient and elevated temperatures; if necessary, provide additional gasketing or edge sealing. UL labeled without any visible seals when door is closed.
- G. Sound-Rated Doors: Tested to STC ratings indicated on Drawings in accordance with ASTM E413, tested in accordance with ASTM E90; STC rating labeled without any visible seals when door is closed.
 - 1. Required as indicated on Drawings; certified and labeled for compliance with STC rating indicated on Drawings.
- H. Wood Veneer Facings:
 - 1. Species:
 - a. Red Oak.
 - 2. Veneer Cut:
 - a. Rift cut.
 - 3. Veneer Adjacent Leaf Matching:
 - a. Slip match.
 - 4. Veneer Panel Leaf Matching:
 - a. Balance match.
 - 5. Doors Matching:
 - a. Pair match.
 - b. Set match doors within 1 foot of each other (doors closed).
 - 6. Doors With Transom Matching:

- a. End match.
7. Finish:
 - a. Shop applied transparent over stain.

2.3 FABRICATION

- A. Bonding Adhesive: Type I - Waterproof.
 1. Compliant with CARB (ATCM) for ultra-low emitting formaldehyde (ULEF).
- B. Provide solid core blocking reinforcement for hardware applications and as follows:
 1. Lock blocks.
 2. Top rail block for closer.
 3. Center rail for exit bar.
 4. Bottom rail block for kickplates.
 5. Hardware through bolt blocks.
- C. Edges For Veneered Doors:
 1. Vertical Edges: Minimum 7/16 inch hardwood laminated to 1 inch (25mm) structural composite lumber and bonded to door core. Exposed hardwood edge species and finish to match door face veneer.
 2. Horizontal Edges: Minimum 1-7/16 inch structural composite lumber and bonded to door core.
- D. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Furnish solid blocking for surface mounted and through bolted hardware.
 1. Comply with hardware requirements indicated on Drawings and as specified in Division 08 for the specifications.
 2. Include machine work required for securing door perimeter seals.
- E. Door and Frame Fit: Fabricate doors so that door edge clearances of installed doors comply with AWI/AWMAC/WI (AWS) standards.

2.4 FINISHES

- A. Shop Applied Finish:
 1. Transparent System - 5, Conversion Varnish.
 - a. Sheen to be as selected by Architect from full range of options.
 2. Stain Color:
 - a. As selected by Architect from full range of colors.
- B. Seal door top edge with color sealer to match door facing.

2.5 ACCESSORIES

- A. Hardware: As specified in Section 08 71 00 - Door Hardware.
- B. Door Frames: As indicated on Drawings.
- C. Door Louvers: Size to be as indicated on Drawings.
 1. Metal Louvers:
 - a. Material and Finish: Roll formed steel; pre-painted finish; color as selected by Architect from full range of options.
 - b. Louver Blades:
 - 1) Inverted V shape.
 - 2) Fire rated to match door with fusible link design to UL (DIR) requirements.
- D. Door View Panels: Size to be as indicated on Drawings.

1. Glazing: As indicated on Drawings, but not less than 1/4 inch (6.4 mm) thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
2. Wood Frame:
 - a. Glazing Stops: Solid wood material, of same species and finish as door facing, lip profile; mitered corners; fasteners to be countersunk, fill and finish to match glazing stop finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Comply with AWI/AWMAC/WI (AWS) standards and Grade indicated, and manufacturer's requirements, unless otherwise specified or indicated.
 1. Fire Rated Doors: Comply with NFPA 80, and fire ratings as indicated on Drawings.
 2. Smoke and Draft Control Doors: Comply with NFPA 105, and smoke and draft control requirements as indicated on Drawings.
 3. Sound Rated Door: Comply with sound rating requirements indicated on Drawings.
- C. Coordinate installation of doors with installation of frames and hardware.
- D. Install door louvers and vision panels plumb and level.
 1. Wood Glazing Stops: Countersink fasteners, fill and finish to match glazing stop finish.

3.4 INSTALLATION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Comply with AWI/AWMAC/WI (AWS) standards and Grade indicated, unless otherwise specified or indicated.
- C. Maximum Vertical or Horizontal Distortion (Bow or Cup): Maximum 1/8 inch measured at center distance from any edge or corner of door.
- D. Comply with AWI/AWMAC/WI (AWS) tolerance requirements and as follows:
 1. Telegraph: Maximum 0.010 inch in any 3 inch span.
 2. Warp: Maximum 0.125 inch per 7 feet of door section.
 3. Squareness: Maximum diagonal variance of 1/8 inch.
 4. Door to Frame Fit and Clearance: 0.125 inch gap.

3.5 ADJUSTING

- A. Section 01 73 00 - Execution: Adjusting.
- B. Adjust door for smooth and balanced door movement and latching.

3.6 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

3.7 SCHEDULE

- A. Door types and locations to be as indicated on Drawings.

END OF SECTION

SECTION 08 31 13
ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire resistive rated and non-rated access doors and panels with frames.
- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry: Placement of access frame unit anchors in masonry partitions.
 - 2. Section 08 71 00 - Door Hardware: Coordinate with locks and keying requirements.
 - 3. Section 09 21 16 - Gypsum Board Assemblies: Placement of access frame unit anchors in gypsum board partitions.
 - 4. Section 09 90 00 - Painting and Coating: Field paint finish.
 - 5. Divisions of Work such as plumbing, HVAC and electrical construction requiring access doors.

1.2 REFERENCES

- A. Intertek Testing Services (ITS):
 - 1. ITS (DIR) - Directory of Listed Products; Current Edition.
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- C. Underwriters Laboratories Inc. (UL):
 - 1. UL (FDR) - Fire Resistance Directory; Current Edition.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate the work of this Section with the work and devices requiring access to controls, valves, traps, dampers, cleanouts, and similar items located behind finished surfaces, but requiring operation and maintenance. Provide access doors and frames for such access.
- C. Coordinate exact locations with various trades and local code requirements to assure proper placement of access doors and panels.
- D. Coordinate locks and keying with requirements indicated in Section 08 71 00 - Door Hardware.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit literature indicating sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining Work.
- C. Shop Drawings: Indicate exact position of each access door units. Indicate sizes that are at variance with sizes indicated and request Architect's approval.
- D. Manufacturer's Installation Instructions: Submit installation requirements and rough-in dimensions.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Project Record Documents: Provide drawings and schedule indicating locations of installed access units.

1.6 QUALITY ASSURANCE

- A. Units in Fire Rated Assemblies: Fire rating as required by applicable code for the fire rated assembly in which access doors and frames are being installed.
 - 1. Provide products listed by ITS (DIR) or UL (FRD) as suitable for the purpose indicated. Attach labels identifying certification.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS

- A. Manufacturers:
 - 1. Acudor Products, Inc.
 - 2. Cendrex, Inc.
 - 3. JL Industries of Activar Construction Products Group, Inc.
 - 4. Karp Associates, Inc.
 - 5. Nystrom, Inc.
 - 6. Milcor LTD, Partnership.
 - 7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Flush Framed Access Doors (Type 1): Frames and nominal 1 inch wide exposed flanges of 16 gage steel and door panels of 14 gage steel.
- C. Gypsum Board Access Doors (Type 2): Frames and nominal 1 inch wide flanges of 16 gage steel and door panels of 14 gage steel. Design flanges to be concealed by gypsum board joint finishing compound specified in Section 09 21 16.
- D. Fire Rated Access Doors (Type 3): Frames and nominal 1 inch wide exposed flanges of minimum 16 gage steel and door panels of 20 gage steel. Provide self-closing and latching doors with keyed lock to match cylinders specified in Section 08 71 00.
- E. Gypsum Board Fire Rated Access Doors (Type 4): 16 gage steel frames with minimum 22 gage galvanized steel drywall bead flanges and door panels of 20 gage steel. Design flanges to be concealed by gypsum board joint finishing compound specified in Section 09 21 16. Provide self-closing and latching doors with keyed lock to match cylinders specified in Section 08 71 00.

2.2 FABRICATION

- A. Factory fabricate units of continuous welded construction; weld, fill, and grind joints to assure flush and square unit.
- B. Wall and Ceiling Access Door and Panel Hardware:
 - 1. Hinges: Standard continuous or concealed spring pin type, 175 degree steel hinges.
 - 2. Latches and Locks:
 - a. Screwdriver Operated Latches:
 - 1) Locations: Non-public secured rooms such as mechanical, electrical, HVAC, and plumbing equipment rooms.
 - b. Keyed Locks: Provide keyed locks. Keyed locks to match cylinders specified in Section 08 71 00.

- 1) Locations: All locations accessible to public and not indicated to be otherwise.

2.3 FINISHES

- A. Base Metal Protection: Factory apply baked-on primer coat that is compatible with indicated finish system.
- B. Finish System: Field paint after installation to match adjacent material finish. Refer to Section 09 90 00 - Painting and Coating.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine substrates for conditions detrimental to installation of the work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify rough openings for access doors and panels are correctly sized and located.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install units in accordance with manufacturer's instructions.
- C. Install frames plumb and level in openings, and secure units rigidly in place.
- D. Position units to provide convenient access to concealed equipment when necessary.
- E. Set concealed frame type units flush with adjacent finished surfaces.
- F. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.

3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust opening/closing and latch operation to smooth operation.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protect installed construction.

END OF SECTION

SECTION 08 41 13**ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Aluminum-framed storefront systems.
 - 2. Glass and glazing panels.
 - 3. Aluminum frame doors and hardware.
 - 4. Structural design requirement.

- B. Related Requirements:
 - 1. Section 05 50 00 - Metal Fabrications: Metal fabricated attachment devices.
 - 2. Section 07 90 00 - Joint Protection: Perimeter joint sealers other than those integral to the aluminum-framed entrances and storefronts frames and glazing.
 - 3. Section 08 11 16.10 - Aluminum Doors with FRP Face Panel.
 - 4. Section 08 14 16 - Flush Wood Doors.
 - 5. Section 08 44 13 - Glazed Aluminum Curtain Walls.
 - 6. Section 08 71 00 - Door Hardware: Hardware requirements for reinforcing plates and electrical items to be integrated into the storefront frame of this Section.
 - 7. Section 08 80 00 - Glazing: Glazing for aluminum-framed entrances and storefronts.
 - 8. .
 - 9. Division 26 - Electrical: Electrical requirements to be integrated into the storefront framing of this Section.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2017.
 - 2. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2014.
 - 3. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2015.
 - 4. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
 - 5. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
 - 6. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
 - 7. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
 - 8. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
 - 9. AAMA SFM-1 - Aluminum Store Front and Entrance Manual; 2014.

- B. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

- C. ASTM International (ASTM):

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
 5. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018, Reapproval 2022.
 6. ASTM E283/E283M - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
 7. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference; 2014, Reapproval 2021.
 8. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2023.
 9. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002, Reapproval 2018.
 10. 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, Reapproval 2023.
- D. The Society for Protective Coatings (SSPC):
1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic, and Type II - Organic); 2019.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
 2. Coordinate work of this Section with related Door Hardware requirements.
 - a. Provide reinforcement in system framing members to accommodate hardware items indicated in this Section and other related door hardware Sections.
 - b. Prepare system framing members to accommodate electrical hardware devices such as security access readers and automatic operators.
 3. Coordinate work of this Section with related Electrical requirements.
 - a. Provide electrical service wiring for electrical hardware devices such as security access readers, automatic operators, and other electrical requirements.
- B. Pre-Installation Meetings:
1. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
 2. Convene minimum one week prior to commencing work of this Section.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit component dimensions; describe components within assembly, anchorage and fasteners, glass and infill panels, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, doors and frames, framed opening requirements and tolerances, anticipated deflection under load, affected related work, weep drainage network, expansion and contraction joint location and details, and field welding required.

1. Details to indicate fasteners and anchoring details to building components and construction.
 2. Details to indicate system interface and maintenance of continuity of building envelope air and weather barrier components by others.
 3. Provide design and calculations sealed by Professional Structural Engineer demonstrating compliance with wind loading per ASCE 7.
 4. Include details of core, stile, and rail construction, trim for lites, and all other components.
 5. Include details of finish hardware mounting.
 6. Include shop applied and field applied sealants by manufacturer; include product name and application locations on drawings. Show sealant joint sizes, including tolerances and maximum/minimum joint sizes required.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 8 x 8 inches. Include samples of glazing, infill panels and glazing materials. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Design Data: Indicate engineered framing members structural and physical characteristics, calculations, dimensional limitations.
- G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- H. Installation Data: Special installation requirements.
- I. Field Quality Control Submittals: Submit field inspection and test reports required in FIELD QUALITY CONTROL article in this Section.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA SFM-1 - Aluminum Storefront and Entrance Manual.
- B. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
1. Same manufacturer required for the following work:
 - a. Aluminum-Framed Entrances and Storefronts.
 - b. Glazed Aluminum Curtain Walls.
- D. Installer Qualifications: Company specializing in performing Work of this Section with minimum five (5) years documented experience.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Handle products of this Section in accordance with AAMA CW-10.
- C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or spray type coatings which bond when exposed to sunlight or weather. Provide adequate ventilation through wrappings.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide five (5) year warranty to correct defective Work.
- C. Provide five (5) year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting, condensation, or misting. Include provision for replacement of failed units.
- D. Provide manufacturer warranty against excessive degradation of metal finishes. Include provision for replacement of units with excessive fading, chalking, peeling, blistering, or flaking. Warranty period to be as follow:
 - 1. Ten (10) year manufacturer warranty.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Aluminum-Framed Storefront System: Includes extruded aluminum framing and doors with supplementary internal support components where required, aluminum and glass entrances, shop fabricated components, factory finished glass, glazing and infill panels, related joint sealers, flashings, anchorage, and attachment devices.
- B. Provide products and system designed to comply with the State Building Code for the State in which the project is located.

2.2 PERFORMANCE REQUIREMENTS

- A. Wind Loads: Design and size components and system to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall, including increased wind loads at building corners.
 - 1. As calculated in accordance with ASCE 7 - Calculation of Wind Loads, as measured in accordance with ASTM E330/E330M.
 - 2. Comply with Design Loads indicated on Drawings and applicable code requirements based on geographical location.
- B. Seismic Loads: Design and size components and system to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable code requirements.
- C. Deflection: Limit mullion deflection to flexure limit of glass of span; with full recovery of glazing materials.
- D. System Assembly: Accommodate the following without damage to system, components, or deterioration of seals.
 - 1. Movement within system.
 - 2. Movement between system, system components and perimeter construction.
 - 3. Dynamic loading and release of loads.
 - 4. Deflection of structural support framing.
 - 5. Tolerance of supporting components.

- E. Air Leakage: 0.06 cfm/sq ft maximum leakage through assembly wall area when tested in accordance with ASTM E283/E283M at the following pressure differential.
 - 1. 1.57 psf pressure differential.
- F. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- G. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1 inch static pressure, 72 degrees F, 40 percent relative humidity without seal failure.
- H. Water Penetration: None, when measured in accordance with ASTM E331 with test pressure differential at 20 percent of design pressure, but not less than 2.86 psf and not to exceed 12.00 psf.
- I. Thermal Transmittance of Assembly (Excluding Entrances): Maximum U-value of 0.45 Btu/(hr sq ft deg F) when measured in accordance with AAMA 1503.
- J. Expansion / Contraction: System to provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12 hour period without causing detrimental effect to system components and anchorage.
- K. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.
- L. 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.

2.3 ALUMINUM-FRAMED STOREFRONTS

- A. Exterior Storefronts: Application to be where one side of storefront is exposed to unconditioned air; includes building exterior exposure.
 - 1. Extruded aluminum frame members with internal reinforcement of aluminum or shaped steel structural sections as required to withstand imposed loads, including loads imposed by operating doors and hardware of types and sizes indicated.
 - 2. Frame components to be thermally broken from exterior exposed surfaces.
 - 3. Frame size, configuration, dimensions, and profile: As indicated on Drawings.
 - a. For frames with laminated glass panels, coordinate with glass panel thickness.
 - b. Continuous perimeter filler.
 - 4. Provide glazing panels and infill panels as indicated on Drawings, sealed weathertight within frames.
 - a. Panel Position Within Frame:
 - 1) As indicated on Drawings.
 - 5. Exterior Subsills: High performance type, profile of extruded aluminum, thermally broken, with back flange turned up full height of frame face and sealed end dams each end.
 - 6. Internal weep drainage system to drain to exterior.
 - 7. Manufacturers:
 - a. Kawneer Co., Inc.
 - b. Oldcastle BuildingEnvelope.
 - c. Tubelite, Inc.
 - d. U.S. Aluminum, a C.R. Lurance Company.
 - e. YKK AP America.
 - f. Substitutions: Section 01 60 00 - Product Requirements.
 - 8. Basis of Design:
 - a. Kawneer Co., Inc.:

- 1) Trifab VG 451T, 2 inch sightline.
- B. Interior Storefronts: Application to be where both sides of storefront are exposed to interior conditioned air.
1. Extruded aluminum frame members with internal reinforcement of aluminum or shaped steel structural sections as required to withstand imposed loads, including loads imposed by operating doors and hardware of types and sizes indicated.
 2. Frame components not required to be thermally broken.
 3. Frame size, configuration, dimensions, and profile: As indicated on Drawings.
 - a. For frames with laminated glass panels, coordinate with glass panel thickness.
 4. Provide glazing panels and infill panels as indicated on Drawings, sealed weathertight within frames.
 - a. Panel Position Within Frame:
 - 1) As indicated on Drawings.
 5. Manufacturers:
 - a. Kawneer Co., Inc.
 - b. Oldcastle BuildingEnvelope.
 - c. RACO.
 - d. Tubelite, Inc.
 - e. U.S. Aluminum, a C.R. Lurance Company.
 - f. YKK AP America.
 - g. Substitutions: Section 01 60 00 - Product Requirements.
 6. Basis of Design:
 - a. Surface Mount Type:
 - 1) Kawneer - Trifab VG 451, 2 inch sightline.

2.4 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical; 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper, wall thickness as required for system application and use but not less than 0.125 inch.
- C. Sheet Steel: ASTM A653/A653M; galvanized to minimum G90.
- D. Steel Sections: ASTM A36/A36M; shaped to suit aluminum framing and mullion members.
 1. For use as concealed structural support reinforcement.
 - a. For exterior framing, steel to be galvanized per ASTM A123/A123M.
 - b. For interior framing, steel to be shop primed.
- E. Structural Supporting Anchors Attached to Structural Steel:
 1. Design to suit attachment requirements.
- F. Structural Supporting Anchors Attached to Reinforced Concrete Members:
 1. Design to suit attachment requirements.
- G. Fasteners: Provide aluminum, non-magnetic stainless steel, or other non-corrosive metal fasteners, recommended to be compatible by the manufacturer of materials being fastened, including doors, frames, stops, panels, hardware, anchors, and other items receiving fasteners. For exposed fasteners (if any) provide Oval Phillips Head screws with finish matching the item to be fastened. The use of sex bolts will not be accepted.
- H. Framing Members Profiles: Extruded aluminum and as indicated on Drawings.
- I. Trim Components Profiles: Extruded aluminum and as indicated on Drawings.
- J. Glass and Glazing Panels:
 1. As indicated on Drawings.

2. As specified in Section 08 80 00 - Glazing.
- K. Doors:
1. Material: As indicated on Drawings.
 2. Thickness: As indicated on Drawings.
 3. Storefront Framing Members:
 - a. Coordinate frame's door stop and door silencer feature (along the frame stop) with door thickness and door type indicated on Drawings.
 - b. Coordinate reinforcement and shop preparation with door hardware, including closers, hinges, latching and locking components, automatic door operators, and other hardware indicated in other Sections.
 - c. Coordinate storefront frames with the specified doors, types, weight, and hardware and as indicated. Provide aluminum storefront frames with internal and concealed reinforcement and anchorage required to support attachment of the hinges and closers and to withstand the operating and closing loads imposed on the storefront frames by the specified doors and hardware. (e.g. The heavy weight of a solid wood door imposes greater operating loads on door frame members than aluminum and FRP doors.).
 - d. Coordinate with security, safety and other electrical wiring and hardware requirements such as automatic door operators and actuators.
 4. Glass and Glazing Panels:
 - a. As indicated on Drawings.
 5. Glazing Stops Profile: As indicated on Drawings.
 6. Stiles and Rails: Extruded aluminum; profiles as indicated on Drawings.
 - a. Exterior door components to be thermally broken; interior door components not required to be thermally broken.
 - b. Coordinate reinforcement and shop preparation with door hardware attachment and operating requirements.
 - c. Unless Indicated Otherwise on Drawings:
 - 1) Stiles to be 6 inches.
 - 2) Top and middle rails to be 6 inches.
 - a) Doors scheduled to receive exit hardware device to be fabricated with middle rail.
 - 3) Bottom rails to be 10 inches.
 7. Finish: For aluminum framed doors, finish to match storefront frame in which the door is set. Finish for other door types shall be as indicated on Drawings or in other Sections.
- L. Door Hardware:
1. Weatherstripping and Sill Sweep Strips: For aluminum frame doors, manufacturer's standard type to suit application; removable for maintenance replacement.
 2. Threshold: Specified in Section 08 71 00. Extruded aluminum, one piece for each door opening, ribbed non-slip surface.
 3. Hinges: Specified in Section 08 71 00.
 4. Exit Panic Devices: Specified in Section 08 71 00.
 5. Closers: Specified in Section 08 71 00.
 6. Automatic Door Operators and Actuators: Specified in Section 08 71 00.
 7. Lock Cylinders: Specified in Section 08 71 00.
 8. Other hardware as may be indicated on Drawings or in Section 08 71 00.
 9. Finish: Exposed hardware to match hardware finishes specified in Section 08 71 00.
- M. Flashings:
1. Exposed Flashings: Sheet aluminum, finish to match framing members.
 - a. Thickness: 18 gauge, 0.040 inch, minimum.
 2. Concealed Flashings: Sheet aluminum.

- a. Thickness: 22 gauge, 0.025 inch, minimum.
- N. Firestopping: As specified in Section 07 84 00.
- O. Storefront System Sealants: As recommended by storefront system manufacturer; silicone type, with adhesion in compliance with ASTM C794; compatible with glazing panels, infill panels, framing members, flashings, other components, and accessories.
- P. Glazing Gaskets and Accessories: As recommended by storefront and glazing system manufacturers; type to suit application to achieve weather, moisture, and air infiltration requirements.
- Q. Perimeter Sealants and Backing Materials: Provide sealants and backing materials complying with requirements specified in Section 07 90 00.
- R. Sealant for Setting Thresholds: Non-curing butyl type.

2.5 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. Provide System Internal Drainage: Drain to the exterior by means of a weep drainage networks any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- D. Prepare system members to receive anchor devices. Fabricate anchors.
- E. Arrange fasteners and attachments to conceal from view.
- F. Prepare system members with internal reinforcement for door hardware.
- G. Prepare system members for installation of door hardware and electrical hardware devices such as security access readers and automatic operators.
- H. Prepare components with internal reinforcement for window treatments.
- I. Reinforce framing members to withstand external imposed loads.
- J. Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.

2.6 SHOP FINISHING

- A. Anodized Aluminum Finish:
 - 1. Color Anodized Finish: AAMA 611, AA-M12C22A44 Electrolytically deposited colored anodic coating; Class I, not less than 0.7 mils thick.
- B. Color and Gloss: As selected by Architect from manufacturer's full range of options.
- C. Touch-Up Materials: As recommended by finish manufacturer for field application.
- D. Extent of Finish:
 - 1. Apply factory coating to surfaces exposed at completed assemblies.
 - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
 - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.
- E. Concealed Steel Items: Galvanized to ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.

- F. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- G. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings are ready to receive Work of this Section.
- D. Verify that construction to which the Work is to be anchored is complete, structurally sound, and adequate to provide the required securement.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install wall system in accordance with engineered design, manufacturer's instructions, and AAMA SFM-1 - Aluminum Storefront and Entrance Manual.
- C. Installation to interface with and maintain continuity of building envelope air and weather barrier components by others.
- D. Coordinate with installers of other products to be installed as integral or surface mounted components to the Work required in this Section.
 - 1. Provide open pathways for electrical wiring and device attachment requirements, to include, but not limited to, the following:
 - a. Electrical hardware devices such as security access readers and automatic operators.
 - b. Electrical life safety and security devices.
- E. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- F. Provide alignment attachments and shims to permanently fasten system to building structure.
- G. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work.
- H. Provide thermal isolation where components penetrate or disrupt building insulation.
- I. Install sill flashings. Turn up ends and edges; seal to adjacent Work to form watertight dam.
- J. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- K. Install integral flashings and integral joint sealers.
- L. Set thresholds in bed setting sealant and secure.

- M. Install hardware using hardware manufacturer's templates. Refer to Section 08 71 00 for door hardware requirements other than specified in this Section.
- N. Glazing:
 - 1. Coordinate installation of glass with Section 08 80 00 - Glazing; separate glass from metal surfaces.
- O. Install system weather seal sealants, seals, gaskets and glazing and infill panels to achieve performance criteria.
- P. Install perimeter sealant and backer to achieve performance criteria conforming with installation criteria specified in Section 07 90 00.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Manufacturer's Field Services: Provide services of storefront manufacturer's field representative to inspect for proper installation of system and submit report. Representative is to submit inspection report, including list of deficiencies within 5 days of each inspection.
 - 1. Inspections Required:
 - a. 10 percent of completion of the work of this Section.
 - b. 50 percent of completion of the work of this Section.
 - c. 100 percent of completion of the work of this Section.
- C. 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 area as directed by Architect or Owner.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
 - 3. Tests are to be observed and reported by storefront manufacturer's field representative. Submit test results and observations report within 5 days of each test.
- D. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements. Submit reports of retest results within 5 days of each retest.

3.5 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/16 inch every 3 feet non-cumulative or 1/16 inches per 10 feet, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.6 ADJUSTING

- A. Section 01 73 00 - Execution: Testing and adjusting.
- B. Adjust operating hardware for smooth operation and latching.

3.7 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.

- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.
- E. Remove excess sealant by method acceptable to sealant manufacturer.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect finished Work from damage.

3.9 DEMONSTRATION AND TRAINING

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.

END OF SECTION

SECTION 08 42 26.10
GLASS DISPLAY CASE DOORS

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes: Glass display case doors and hardware.
- B. Related Requirements:
 - 1. Section 07 90 00 - Joint Protection: System perimeter sealant and back-up materials.
 - 2. Section 08 71 00 - Door Hardware: Lock cylinders.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- B. ASTM International (ASTM):
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
 - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
 - 3. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
 - 4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
 - 5. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2021.
 - 6. ASTM B455/B455M - Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes; 2020.
 - 7. ASTM C1036 - Standard Specification for Flat Glass; 2021.
 - 8. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with adjacent construction to accommodate anchorage of the work of this Section.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for system components including glass; door hardware, rails, frames, and finishes.
- C. Shop Drawings: Indicate elevations, framed opening requirements, tolerances; anchorage and fasteners; glass; door hardware requirements and installation details.
- D. Samples for Initial Selection: Two sets, representing manufacturer's full range of available metal materials and finishes.
- E. Samples for Verification: From the Architects initial selection, prepare and submit two samples, minimum size 6 inches representing actual material and finish of exposed metal and of glass.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures. Requirements for submittals.
- B. Operation and Maintenance Data: Submit for maintaining metal finishes. Include care and cleaning instructions, list of recommended cleaning and polishing materials, and lubrication requirements.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept all-glass entrances on site in manufacturer's protective packaging. Inspect for damage.
- C. Protect finished metal surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish five (5) year manufacturer's warranty for door closers.

1.9 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 - 1. Furnish two (2) sets of special wrenches and tools for door closers.

PART 2 PRODUCTS**2.1 GLASS DISPLAY CASE DOORS**

- A. Manufacturers:
 - 1. CR Laurence.
 - 2. Dorma Glass.
 - 3. Sugatsune.
 - 4. Virginia Glass Products Corp.
 - 5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Frameless Doors:
 - 1. Door Operation: Swing.
 - 2. Glass Type:
 - a. Laminated glass.
 - 3. Glass Thickness:
 - a. 3/8 inch thick.
 - 4. Door Rails: Extruded aluminum.
 - a. Location: Door top and bottom.
 - b. Rail Shape: Square.

- c. Rail Height:
 - 1) 2.5 inches.
- d. Rail Thickness: As required for door loads and hardware.
- 5. Stops and Locks: Incorporated into rails.
- 6. Header:
 - a. Extruded aluminum.
 - b. As indicated on Drawings.
 - c. Concealment for closer.
- 7. Door Hardware: Stainless steel, unless specified otherwise.
 - a. Pivots:
 - 1) Floor mounted center hung pivot with cover plate.
 - b. Closer:
 - 1) Concealed in header.
 - c. Lock: Bottom rail; cylinder type; keyed outside, thumb turn inside.
 - d. Lock Cylinders: As specified in Section 08 71 00.

2.2 COMPONENTS

- A. Steel Sections: ASTM A36/A36M; shapes to suit frame sections.
- B. Aluminum Extrusions: ASTM B221 (ASTM B221M), alloy 6063, temper T5.
- C. Stainless Steel: ASTM A666; Type 304.
- D. Brass Components: Conforming to ASTM B455/B455M.
- E. Fasteners: Stainless steel.
- F. Tempered Glass: Flat glass meeting requirements of ASTM C1036, Type I - Transparent Flat Glass, Quality Q3, and Kind FT, fully tempered, in accordance with ASTM C1048, and as follows:
 - 1. Thickness: 3/8 inch (9.5 mm).
 - 2. Color: Class 1, Clear.
 - 3. Prepare glazing panels for required fittings and hardware before tempering.
 - 4. Polish edges that will be exposed in finished work to bright flat polish.
 - 5. Temper glass materials horizontally; visible tong marks or tong mark distortions are not permitted.

2.3 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate doors with continuous top and bottom continuous rails. Reinforce rails with steel sections or tie rods where required.
- C. Fabricate sidelights with continuous top and bottom glazing channels.
- D. Fabricate doors and sidelights allowing for minimum clearances and shim spacing around perimeter of assembly.
- E. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof.
- F. Break form cladding to match rail profiles. Fabricate cladding to align flush with adjacent cladding with hairline joints.
- G. Prepare components to receive anchor devices and hardware. Fabricate anchorage items.
- H. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- I. Prepare components with drillings for door hardware.

2.4 SHOP FINISHING

- A. Stainless Steel Finishes:
 - 1. Satin Polished Finish: Number 4, satin directional polish parallel with long dimension of finished face.
- B. Galvanizing: ASTM A123/A123M; hot dip galvanized after fabrication.
- C. Aluminum Finish:
 - 1. Clear Anodized Finish: AAMA 611, AA-M12C22A41 Clear anodic coating; Class I, not less than 0.7 mils thick.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that openings are acceptable.
- C. Do not begin installation until substrates and openings have been properly prepared.
- D. If substrate and anchorage locations preparation is not as required for installation of the Work, correct unsatisfactory preparation before proceeding.
- E. Verify wall openings are ready to receive work of this section.
- F. Verify block outs for floor closers are sized and located properly.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install in accordance with manufacturer's installation instructions.
- C. Use anchorage devices to securely attach glazing channels assembly to structure.
- D. Align assembly plumb and to indicated position, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Install hardware and hang doors.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Horizontal Components and Sight Lines: Not more than 1/16 inch in 10 feet variation from level, non-cumulative.
- C. Vertical Components and Sight Lines: Not more than 1/16 inch in 10 feet variation from plumb, non-cumulative.
- D. Variation from Plane or Indicated Location: Not more than 1/16 inch (1.6 mm).

- E. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.5 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust doors to operate correctly, without binding to frame, sill, or adjacent doors.
- C. Adjust operating hardware for smooth, balanced operation.

3.6 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.
- C. Remove protective material from prefinished surfaces.
- D. Wash down exposed surfaces using solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- E. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.7 PROTECTION OF FINISHED WORK

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect finish work and glazing from damage.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Stile and Rail Wood Doors"
 - d. "Interior Aluminum Doors and Frames"
 - e. "Aluminum-Framed Entrances and Storefronts"
 - f. "Stainless Steel Doors and Frames"
 - g. "Special Function Doors"
 - h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
 2. Recommended Locations for Builders Hardware
 3. Keying Systems and Nomenclature
 4. Installation Guide for Doors and Hardware
- C. NFPA – National Fire Protection Association
1. NFPA 70 – National Electric Code
 2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
 3. NFPA 101 – Life Safety Code
 4. NFPA 105 – Smoke and Draft Control Door Assemblies
 5. NFPA 252 – Fire Tests of Door Assemblies
- D. ANSI - American National Standards Institute
1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
 2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
 3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
 4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
 5. ANSI/SDI A250.8 - Standard Steel Doors and Frames
- 1.03 SUBMITTALS
- A. General:
1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
 2. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
- B. Action Submittals:
1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
 2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
 3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
 4. Door Hardware Schedule:

- a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
- a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
- C. Informational Submittals:
1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
 2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.
- D. Closeout Submittals:
1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.
 - d. Final keying schedule
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. Fire door assemblies, in compliance with NFPA 80.
 - b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.
 - c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
3. Electrified Door Hardware
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
4. Accessibility Requirements:

- a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference

- a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.

2. Pre-installation Conference

- a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- b. Inspect and discuss preparatory work performed by other trades.
- c. Inspect and discuss electrical roughing-in for electrified door hardware.
- d. Review sequence of operation for each type of electrified door hardware.
- e. Review required testing, inspecting, and certifying procedures.
- f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:

- a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) 10 years
 - 2) Exit Devices
 - a) 10 years
 - 3) Closers
 - a) 30 years
 - 4) Automatic Operators
 - a) 2 years
 - b. Electrical Warranty
 - 1) Locks
 - a) 3 years
 - 2) Exit Devices
 - a) 3 years

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.

- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

- 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
- 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
- 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

- 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

C. Cable and Connectors:

- 1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
- 2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
- 3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

- 1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
- 2. Acceptable Manufacturers and Products:
 - a. McKinney TB series
 - b. Best FBB series

B. Requirements:

- 1. Provide hinges conforming to ANSI/BHMA A156.1.
- 2. Provide five knuckle, ball bearing hinges.
- 3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

- a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
 5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
 6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
 7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
 8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
 9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. ABH
 - b. Select

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.06 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage L9000 series
2. Acceptable Manufacturers and Products:
 - a. Accurate 9000/9100 series
 - b. Sargent 8200 series
 - c. Corbin-Russwin ML2000 series

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-3/5-inch x 3/5 inch with 180-degree visibility. Provide messages color-coded using ANSI Z535 Safety Red with full text and/or symbols, as scheduled, for easy visibility. When applicable allows for lock status indication on both sides of the door.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
7. Provide motor based electrified locksets that comply with the following requirements:
 - a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
 - b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
 - c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.

- d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
 - e. Connections – provide quick-connect Molex system standard.
8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
 - a. Vandlgard: Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.
 - b. Lever Design: 06.

2.07 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin 99/33A series
2. Acceptable Manufacturers and Products:
 - a. Detex Advantex series
 - b. Precision APEX 2000 series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide grooved touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.08 CYLINDERS

- A. Manufacturers:
 - 1. Scheduled Manufacturer and Product:
 - a. Best
 - 2. Acceptable Manufacturers and Products:
 - a. No Substitute
- B. Requirements:
 - 1. Provide cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

2.09 KEYING

- A. Scheduled System:
 - 1. Existing factory registered system:
 - a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
 - 2. Existing non-factory registered system:
 - a. Provide cylinders/cores keyed into Owner's existing keying system managed by Owner's locksmith, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference. Contact:
 - 1) Firm Name:
 - 2) Contact Person:
 - 3) Telephone:
- B. Requirements:
 - 1. Construction Keying:
 - a. Replaceable Construction Cores.
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - a) 3 construction control keys
 - b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.
 - 2. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
 - b. Forward biting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.

- 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
- 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
- 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
- e. Quantity: Furnish in the following quantities.
 - 1) Permanent Control Keys: 3.
 - 2) Master Keys: 6.
 - 3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
 - 4) Key Blanks: Quantity as determined in the keying meeting.

2.10 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4040XP series
2. Acceptable Manufacturers and Products:
 - a. Corbin-Russwin DC8000 series
 - b. Sargent 281 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter piston with 5/8-inch (16 mm) diameter double heat-treated pinion journal. QR code with a direct link to maintenance instructions.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards. Provide snap-on cover clip, with plastic covers, that secures cover to spring tube.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck. Provide graphically labelled instructions on the closer body adjacent to each adjustment valve. Provide positive stop on reg valve that prevents reg screw from being backed out.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.
11. Closers shall be capable of being upgraded by adding modular mechanical or electronic components in the field.

2.11 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.12 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.13 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
 - a. Glynn-Johnson
2. Acceptable Manufacturers:
 - a. Rixson
 - b. ABH

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.14 DOOR STOPS AND HOLDERS

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Ives
 - 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
- B. Provide door stops at each door leaf:
 - 1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
 - 2. Where a wall stop cannot be used, provide universal floor stops.
 - 3. Where wall or floor stop cannot be used, provide overhead stop.
 - 4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.15 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Zero International
 - 2. Acceptable Manufacturers:
 - a. National Guard
 - b. Reese
- B. Requirements:
 - 1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
 - 2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
 - 4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.16 SILENCERS

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Ives
 - 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
- B. Requirements:
 - 1. Provide "push-in" type silencers for hollow metal or wood frames.

2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.17 MAGNETIC HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. LCN
2. Acceptable Manufacturers:
 - a. Rixson
 - b. Sargent

B. Requirements:

1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.18 DOOR POSITION SWITCHES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Schlage
2. Acceptable Manufacturers:
 - a. GE-Interlogix
 - b. Sargent

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.19 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum

10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 - 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
 - 1. Install construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as indicated in keying section.

3. Furnish permanent cores to Owner for installation.
- J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
1. Conduit, junction boxes and wire pulls.
 2. Connections to and from power supplies to electrified hardware.
 3. Connections to fire/smoke alarm system and smoke evacuation system.
 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 5. Connections to panel interface modules, controllers, and gateways.
 6. Testing and labeling wires with Architect's opening number.
- K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- L. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.
- M. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- N. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- P. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- R. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- T. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

Hardware Group No. 01

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
1	EA	PANIC HARDWARE	CD-99-DT	626	VON
1	EA	PANIC HARDWARE	CD-99-NL	626	VON
1	EA	RIM CYLINDER	1E72	626	BES
3	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 HCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

Hardware Group No. 02

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	CD-99-DT	626	VON
3	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 HCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

Hardware Group No. 03

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	LD-99-NL	626	VON
1	EA	RIM CYLINDER	1E72	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

Hardware Group No. 04

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
1	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	PANIC HARDWARE	LD-99-NL	626	VON
1	EA	RIM CYLINDER	1E72	626	BES
1	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

Hardware Group No. 05

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MT-RHO-L 4AA BATTERY	626	SCE
1	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

COORDINATE WITH ALL RELATED TRADES. ENTRY BY CREDENTIAL OR KEY OVERRIDE.
PRESENTING VALID CREDENTIAL TO READER WILL UNLOCK DOOR FOR ENTRY.
FREE EGRESS AT ALL TIMES.

Hardware Group No. 06

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

Hardware Group No. 07

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	FIRE EXIT HARDWARE	9927-EO-F-LBR-499F	626	VON
1	EA	FIRE EXIT HARDWARE	9927-L-F-LBR-06-499F	626	VON
1	EA	RIM CYLINDER	1E72	626	BES
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	MAGNET	SEM7850 12V/24V/120V	↗ 695	LCN
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	MEETING STILE GASKETING	8217SBK PSA	BK	ZER

Hardware Group No. 08

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
1	EA	PANIC HARDWARE	CD-99-DT	626	VON
1	EA	PANIC HARDWARE	CD-99-NL	626	VON
1	EA	RIM CYLINDER	1E72	626	BES
3	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 HCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 09

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	CD-99-DT	626	VON
3	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	SURFACE CLOSER	4111 HCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 10

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP/HOLDER	FS495	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 11

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 12

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	L9070L 06A	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
1	EA	OH STOP	90S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 13

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	MANUAL FLUSH BOLT	FB458	626	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	CLASSROOM LOCK	L9070L 06A	626	SCH
1	EA	MORTISE CYLINDER	1E74	626	BES
2	EA	OH STOP & HOLDER	90H	630	GLY
2	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 14

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-70-MT-RHO-L 4AA	626	SCE
			BATTERY		
1	EA	RIM CYLINDER	1E72	626	BES
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	GASKETING	BY DOOR/FRAME MANUFACTURER		
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

COORDINATE WITH ALL RELATED TRADES. ENTRY BY CREDENTIAL OR KEY OVERRIDE.
PRESENTING VALID CREDENTIAL TO READER WILL UNLOCK DOOR FOR ENTRY.
FREE EGRESS AT ALL TIMES.

END OF SECTION

SECTION 08 80 00**GLAZING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Glass glazing materials and installation requirements are included in this Section for frame assemblies specified in other Sections.
- B. Related Requirements:
 - 1. Section 07 90 00 - Joint Protection: Sealant and back-up material other than glazing sealants.
 - 2. Section 08 11 13 - Hollow Metal Doors and Frames: Doors and frames to receive glazing in this Section.
 - 3. Section 08 14 16 - Flush Wood Doors: Doors to receive glazing in this Section.
 - 4. Section 08 11 16.10 - Aluminum Doors with FRP Face Panel: Doors to receive glazing in this Section.
 - 5. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Framing system to receive glazing in this Section.
 - 6. Section 08 44 13 - Glazed Aluminum Curtain Walls: Framing system to receive glazing in this Section.

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI Z97.1 - Safety Glazing Materials Used In Buildings - Safety Performance Specifications And Methods Of Test; 2015, Reapproval 2020.
- B. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
 - 1. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005, Reapproval 2019.
 - 2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
 - 3. ASTM C1036 - Standard Specification for Flat Glass; 2021.
 - 4. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
 - 5. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
 - 6. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016; Reapproval 2023.
 - 7. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
 - 8. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
 - 9. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
 - 10. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
 - 11. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- D. Code of Federal Regulations (CFR):

1. 16 CFR 1201 - Safety Standard for Architectural Glazing; Current Edition.
- E. Glass Association of North America (GANA):
 1. GANA (GM) - GANA Glazing Manual; 2022.
 2. GANA (SM) - GANA Sealant Manual; 2008.
 3. GANA (LGRM) - Laminated Glazing Reference Manual; 2019.
- F. National Fenestration Rating Council Incorporated (NFRC):
 1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors; 2023.
 2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.
 3. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2023.
- G. National Fire Protection Association (NFPA):
 1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
 3. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies; 2022.
- H. Underwriters Laboratories Inc. (UL):
 1. UL (BMD) - Building Materials Directory; Current Edition.
 2. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.3 PRE-INSTALLATION MEETING

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week before starting Work of this Section; require attendance by all affected installers.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
 1. Glass: Provide structural, physical, and environmental characteristics, size limitations, special handling, or installation requirements. Include manufacturer's full range of samples of glass tinting options for Architects selection.
 2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify full range of available colors.
- C. Shop Drawings:
 1. Indicate sizes, layout, thicknesses, and loading conditions for glass.
- D. Samples:
 1. Glass: Submit two samples, 12 x 12 inches in size, of each glass type.
 2. Glazing Units: Submit two samples, 12 x 12 inches size, of assembled sealed insulating glazing units.
 3. Glazing Materials: Submit 12 inch long bead of glazing sealant and gaskets, color as selected.
- E. Design Data: Submit design calculations indicating compliance with requirements for resistance of wind loads for glass and glazing units.
- F. Certifications: Submit the follow.
 1. Certify that products of this Section meet or exceed specified requirements.
 2. Manufacturer's qualification certification.

3. Fabricator's qualification certification.
4. Installer's qualification certification.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following standards:
 1. GANA (GM) - GANA Glazing Manual.
 2. GANA (SM) - GANA Sealant Manual.
 3. GANA (LGRM) - Laminated Glazing Reference Manual.
 4. Maintain one copy of each document on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five (5) years of documented experience.
- C. Fabricator Qualifications: Fabricator certified by glass manufacturer for type of glass, glass unit, coating, and treatment involved and capable of providing requirements indicated in this Section.
- D. Installer Qualifications: Company specializing in performing work of this Section with minimum five (5) years of documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not install glazing when ambient temperature is less than 50 degrees F.
- C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting, condensation or misting, and replacement of failed units.
- C. Laminated Glass: Provide a ten (10) year warranty to include coverage for delamination, including replacement of failed units.
- D. Spandrel Glass: Provide a five (5) year warranty to include coverage for deterioration of spandrel glass coating, including replacement of failed units.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 1. Extra Insulating Glass Units: One percent (1%), but no less than one (1) each, of each type and size installed. Furnish storage rack to hold all pieces of glass.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide glazing and glazing assemblies of type and thickness designed to support assembly dead loads and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass. Comply with the State Building Code for the State in which the project is located.

1. Wind Loads: Design and size glazing and glazing assemblies to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall, including increased wind loads at building corners.
 - a. Design calculations of glass and glass assemblies to be in accordance with ASCE 7.
 - b. Comply with Design Loads indicated on Drawings and applicable code requirements based on geographical location.
 - c. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 2. Seismic Loads: Design and size components and system to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable code requirements.
 3. Exterior Glass Deflection: Maximum of 1/175 of glass edge length or 3/4 inch, whichever is less with full recovery of glazing materials.
 4. Glass thickness listed in this Section and on Drawings is minimum. Actual thickness to be as required by design to comply with performance requirements.
- B. Fire Rated Door Glazing:
1. Provide glazing complying with NFPA 80 and tested in accordance with one of the following:
 - a. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
 - b. UL 10C.
 - c. Maintain one copy of each document on site.
 2. Apply label from agency approved by authority having jurisdiction to identify each fire rated glass lite.
- C. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
1. In conjunction with vapor retarder and joint sealer materials described in other Sections.
 2. To utilize the inner pane of multiple pane insulating glass units for the continuity of the vapor retarder and air barrier seal.
 3. To maintain a continuous vapor retarder and air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.
- D. Thermal and Solar Optical Performance: Measured or calculated in accordance with the following:
1. U-Values: NFRC 100.
 2. Solar Heat Gain Coefficients: NFRC 200.
 3. Solar Optical Properties: NFRC 300.

2.2 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless noted otherwise.
1. Glass Lite Thicknesses: As indicated, but not less than 1/4 inch; provide greater thickness as required for exterior glazing wind load design.
 2. Annealed Glass: ASTM C1036, Type I (transparent flat), Class 1 (clear), Quality-Q3.
 3. Tinted Glass: ASTM C1036, Type 1 (transparent flat), Class 2 (tinted), Quality-Q3, color and performance characteristics as indicated.
 4. Heat-Strengthened Glass: ASTM C1048, Kind HS.
 5. Fully Tempered Safety Glass: ASTM C1048, Kind FT.
 6. Acid Etched Glass: ASTM C1036, Type II (transparent flat), Class 1 (clear), Quality-Q3.

7. Tempered Acid Etched Glass: ASTM C1048 Kind FT (fully tempered), Type II (transparent flat), Class 1 (clear), Quality-Q3.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
 1. Laminated Safety Glass:
 - a. Comply with ANSI Z97.1 - Class A or 16 CFR 1201 - Category II impact test requirements.
 2. Interlayer:
 - a. Polyvinyl Butyral (PVB) Interlayer; 0.030 inch thick, minimum.
- C. Low-E Coating Types:
 1. Low-E (solar control): Manufactured using the magnetron sputtered vacuum deposition (MSVD) process and in compliance with ASTM C1376.

2.3 INSULATING GLASS UNITS - GENERAL

- A. Manufacturers:
 1. Cardinal Glass Industries.
 2. Guardian Industries Corporation.
 3. Pilkington North America Inc.
 4. Viracon (Subsidiary of Apogee Enterprises, Inc.)
 5. Vitro Architectural Glass (formerly PPG Glass).
 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Guardian Industries Corporation.
- C. Fabricators:
 1. Fabricator certified by glass manufacturer for type of glass, glass unit, coating, and treatment involved and capable of providing requirements indicated in this Section.
- D. Insulating Glass Units: Types as indicated.
 1. Factory assembled units consisting of continuously sealed lites of glass separated by an aluminum (or stainless steel) spacer with sealants.
 2. Overall Unit Thickness: Dependent on assembled unit components.
 3. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 4. Metal Edge Spacers:
 - a. Aluminum, mitered and spigoted.
 - 1) Desiccant: Molecular sieve or silica gel, or blend of both.
 5. Edge Seal: Dual Seal - Glass to elastomer with supplementary silicone sealant.
 6. Interpane Air Space: Purged dehydrated space, and hermetically sealed. Space fill type to be as indicated in each IGU Type.
 7. Primary IGU Seal:
 - a. The primary IGU sealant must be fully wetted against the glass and be continuous around the perimeter of each side with a targeted width of 5/32 inch and a minimum width of 3/32 inch.
 - b. The minimum thickness of the primary seal after pressing is 1/16 inch.

2.4 INSULATING GLASS UNITS

- A. **Type IG1** - Insulating Glass Unit:
 1. Outboard Lite:
 - a. Coating:
 - 1) Low-E Coating (solar control type), on #2 surface.
 - a) Basis of Design: Guardian - SunGuard SN 54.
 - b. Tint:
 - 1) Class 1 - Clear.
 - c. Glass Type:

- 1) Fully Tempered Safety Glass.
 - d. Glass Thickness: 1/4 inch (6 mm) minimum.
 2. Inboard Lite:
 - a. Coating:
 - 1) None.
 - b. Tint:
 - 1) Class 1 - Clear.
 - c. Glass Type:
 - 1) Fully Tempered Safety Glass.
 - d. Glass Thickness: 1/4 inch (6 mm) minimum.
 3. Interspace Content: 1/2 inch (12.7 mm) wide.
 - a. Dehydrated Air filled.
 4. Overall Unit Thickness: 1 inch (25 mm).
 5. Provide labeling where safety glazing labeling is required.
- B. **Type IG2 - Insulating Glass Unit:**
 1. Outboard Lite:
 - a. Coating:
 - 1) Low-E Coating (solar control type), on #2 surface.
 - a) Basis of Design: Guardian - SunGuard SN 54.
 - b. Tint:
 - 1) Class 2 - Tinted:
 - a) Color: As selected by Architect from manufacturer's full range.
 - c. Glass Type:
 - 1) Laminated Safety Glass.
 - d. Glass Thickness: 1/4 inch (6 mm) minimum.
 2. Inboard Lite:
 - a. Coating:
 - 1) None.
 - b. Tint:
 - 1) Class 1 - Clear.
 - c. Translucent Finish Type:
 - 1) Acid etched texture on #3 surface.
 - a) Basis of Design: Gurardian - SatinDeco.
 - 2) Translucent Appearance/Design/Privacy:
 - a) Matte Frosted.
 - b) Object image presents as shadow but no form.
 - c) As selected by Architect from manufacturer's full range.
 - d. Glass Type:
 - 1) Laminated Safety Glass.
 - e. Glass Thickness: 1/4 inch (6 mm) minimum.
 3. Interspace Content: Air, 1/2 inch (12mm) wide, hermetically sealed, dehydrated space.
 4. Overall Unit Thickness: 1 inch (25 mm).
 5. Provide labeling where safety glazing labeling is required.
- C. **Type IG3 - Insulating Glass Unit:**
 1. Outboard Lite:
 - a. Coating:
 - 1) Low-E Coating (solar control type), on #2 surface.
 - a) Basis of Design: Guardian - SunGuard SN 54.
 - b. Tint:
 - 1) Class 2 - Tinted:
 - a) Color: As selected by Architect from manufacturer's full range.

- c. Glass Type:
 - 1) Fully Tempered Safety Glass.
- d. Glass Thickness: 1/4 inch (6 mm) minimum.
2. Inboard Lite:
 - a. Coating:
 - 1) None.
 - b. Tint:
 - 1) Class 1 - Clear.
 - c. Glass Type:
 - 1) Fully Tempered Safety Glass.
 - d. Glass Thickness: 1/4 inch (6 mm) minimum.
3. Interspace Content: Air, 1/2 inch (12mm) wide, hermetically sealed, dehydrated space.
4. Overall Unit Thickness: 1 inch (25 mm).
5. Provide labeling where safety glazing labeling is required.

2.5 GLASS UNITS - SINGLE PANE

- A. **Type FG** - Float Glass (non-safety type).
 1. Applications: Locations as follows.
 - a. Locations as indicated on Drawings.
 2. Tint:
 - a. Class 1 - Clear.
 - 1) Exception: If adjacent glass is tinted, match tinted glass.
 3. Glass Type:
 - a. Heat-Strengthened float glass.
 4. Total Thickness: 1/4 inch.
- B. **Type SGT** - Safety Glass, Tempered.
 1. Application: Locations as follows.
 - a. Locations as indicated on Drawings, and locations required by applicable federal, state, and local codes and regulations.
 2. Tint:
 - a. Class 1 - Clear.
 - 1) Exception: If adjacent glass is tinted, match tinted glass.
 3. Glass Type: Fully Tempered Safety Glass.
 4. Thickness: 1/4 inch.
- C. **Type SGL** - Safety Glass, Laminated.
 1. Application: Locations as follows.
 - a. Locations indicated on Drawings.
 2. Tint:
 - a. Class 1 - Clear.
 - 1) Exception: If adjacent glass is tinted, match tinted glass.
 3. Glass Type: Laminated Safety Glass.
 4. Thickness: 1/4 inch.

2.6 GLAZING COMPOUNDS

- A. All materials to be approved by manufacturers of products to which glazing compounds are to be applied.
- B. 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.

- C. 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; Black color.

2.7 ACCESSORIES

- A. All accessories to be approved by manufacturers of products to which accessories are to be applied.
- B. Setting Blocks: Neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inches x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inches long x one half the height of the glazing stop x thickness to suit application, self-adhesive on one face.
- D. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
 - 1. Width: As required for application.
 - 2. Thickness: As required for application.
 - 3. Manufacturers:
 - a. Pecora Corporation - Extru-Seal Glazing Tape.
 - b. Tremco Sealants - Tremco 440 Glazing Tape.
- E. Spacer Rod Diameter: As required for application.
- F. Glazing Gaskets (Splines): Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- G. Fire-Resistant Glazing Materials: Materials used to obtain required fire-resistant rating.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- C. Verify that the minimum required face and edge clearances are being provided.
- D. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- E. Verify that sealing between joints of framing system members has been completed effectively.
- F. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.

- B. Prepare materials to be installed and equipment used during installation.
- C. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- D. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- E. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3 INSTALLATION - GENERAL

- A. Perform installation in accordance with GANA Glazing Manual.
 - 1. Glazing Sealants: Comply with ASTM C1193.
 - 2. Fire Rated Openings: Comply with NFPA 80.
- B. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- C. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- D. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- E. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- F. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- G. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as weld splatter, fire-safing, plastering, mortar droppings, etc.

3.4 INSTALLATION METHODS

- A. Utilize installation method required by manufacturer and glazing system design.
- B. Dry Glazing Method (Gasket Glazing):
 - 1. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
 - 2. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
 - 3. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
 - 4. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.
- C. Dry Glazing Method (Tape and Gasket Spline Glazing):
 - 1. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
 - 2. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
 - 3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
 - 4. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
 - 5. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
 - 6. Carefully trim protruding tape with knife.
- D. Dry Glazing Method (Tape and Tape):
 - 1. Application - Interior Glazed: Set glazing infills from the interior of the building.
 - 2. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
 4. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
 5. Place glazing tape on free perimeter of glazing in same manner described above.
 6. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
 7. Carefully trim protruding tape with knife.
- E. Wet Glazing Method (Compound and Compound):
1. Application - Interior Glazed: Set glazing infills from the interior of the building.
 2. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inches centers, kept 1/4 inch below sight line.
 3. Locate and secure glazing pane using glazers' clips.
 4. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.
- F. Wet/Dry Glazing Method (Preformed Tape and Sealant):
1. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
 2. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
 3. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
 4. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
 5. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
 6. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
 - a. Place glazing tape on glazing pane of unit with tape flush with sight line.
 7. Fill gap between glazing and stop with glazing manufacturer's required sealant type to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
 8. Apply cap bead of glazing manufacturer's required sealant type along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- C. Monitor and report installation procedures and unacceptable conditions.

3.6 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- C. Remove non-permanent labels immediately after glazing installation is complete.
- D. Clean glass and adjacent surfaces after sealants are fully cured.

- E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

3.8 SCHEDULE

- A. Refer to Drawings for locations of Glass Unit Types.

END OF SECTION

SECTION 08 91 00**LOUVERS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes louvers, frames, and accessories.
- B. Related Requirements:
 - 1. Section 07 90 00 - Joint Protection: Sealant at louver perimeter.
 - 2. Division 23 - Heating, Ventilating and Air-Conditioning (HVAC): Coordinate Work of this Section with requirements of HVAC systems.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. Air Movement and Control Association International, Inc. (AMCA):
 - 1. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2023.
 - 2. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021, Editorial Revisions 2022.
- C. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria For Buildings And Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM International (ASTM):
 - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with installation of masonry flashings.
- C. Coordinate Work with installation of mechanical ductwork and electrical services to motorized devices.
- D. Coordinate air-flow rate and capacity to comply with the design requirements indicated in the contract documents.
- E. Verify field measurements prior to fabrication.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit 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, blank-off panel areas required, and frames.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selection.
- E. Samples for Verification: From the Architect's initial selection, prepare two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AMCA 500-L testing and AMCA 511 certification. Attach AMCA seal to louvers.
- B. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.

1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide minimum fifteen (15) year manufacturer's warranty on finish.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design and size system components and anchorage to safely withstand assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to louver plane.
 - 1. Wind Design Pressure:
 - a. As indicated on Drawings, in accordance with ASCE 7, and in accordance with the State Building Code for the State in which the project is located.
- B. Louver Air Passage: To permit passage of air at velocity of 750 ft / min without blade vibration or noise, with maximum static pressure loss of 0.10 inches measured at 750 ft / min.
- C. Louver Free Area: To permit 50 percent free area.
- D. Louver Water Penetration: Not more than 0.01 oz/sq ft of free area at minimum 750 ft / min face velocity.

2.2 WALL LOUVERS

- A. Manufacturers:
 - 1. Airline Products Company.
 - 2. Airolite.
 - 3. Arrow United Industries.

4. Construction Specialties Inc.
 5. Greenheck Corporation.
 6. Ruskin.
 7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Construction Specialties, Inc. - Model RS-5300.
- C. Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
- D. Louver Construction: Extruded aluminum; size, configuration and face dimensions as indicated on Drawings.
- E. Louver Panel Depth: Minimum 5 inches deep, or deeper if required by size and performance requirements.
- F. Heads, sills, jambs, and mullions to be one-piece structural aluminum extrusion members; minimum extrusion wall thickness to be 0.081 inch and with integral perimeter formed with sealant slot and retaining bead to retain backer rod for sealant application.
1. Intermediate Mullions: Concealed of extruded aluminum, profiled to suit louver frame.
- G. Louver Blades: Drainable blades to be one-piece aluminum extrusions; minimum extrusion wall thickness to be 0.060 inch and with integral front lip gutter and multiple secondary gutters designed to stop and drain moisture to exterior of building envelope.
1. Storm proof, sloped at 45 degrees, chevron style.
- H. Sill Pan: Sill flashings to include sill pan, minimum 3 inch high by full depth formed from minimum 0.050 inch thick aluminum; single length one-piece construction; integral formed drip edge to divert moisture away from building face. End dam side panels to be continuous welded to sill pan and full height of sill pan.
- I. Hinged Units: Where indicated on Drawings, provide secondary frame to which louver frame is attached; non-ferrous hinges; all finishes to match colors selected by Architect.

2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical or 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper, wall thickness as required for system application and use but not less than 0.050 inch.

2.4 ACCESSORIES

- A. Screens: Mechanically fasten to interior side of louver.
1. Bird Screen: Interwoven wire mesh of aluminum, 0.063 inch diameter wire, 1/2 inch open weave, square design, set in aluminum frame.
 2. Insect Screen: 18 x 16 size aluminum mesh, set in aluminum frame.
- B. Blank-Off Panels: Furnish where indicated on the Drawings; fabricated by the louver manufacturer; metal type to be same as louver and frame metal type; metal finish type to be same as louver finish type.
1. Panel Type:
 - a. Composite Metal Sheet Panel: Blank-off panels to be composite construction faced on both sides with 0.032 inch (0.81 mm) thick metal sheet and core to be expanded polystyrene (EPS) having R-value of 4, minimum. Panel perimeter frame to be 0.050 inch (1.27mm) thick-formed metal channels; mitered at the corners.

- 1) Composite Panel Thickness:
 - a) 2 inches.
 2. Secure blank-off panels to interior side of louver and fully sealed weathertight.
 3. Blank-Off Panels Finish: In accordance with AAMA 2605, 70 percent resin fluoropolymer coating, minimum 1.4 mil (0.035mm) thick; color to be flat black.
- C. Fasteners and Anchors: Concealed; stainless steel type.
- D. Flashings: Sheet aluminum; finish to match louver finish.
- E. Sealants: Silicone type specified in Section 07 90 00.

2.5 FACTORY FINISHING

- A. Powder Coat: Polyvinylidene fluoride (PVDF) powder coat system complying with AAMA 2605, minimum 70 percent PVDF resin with minimum total dry film thickness (DFT) of 1.5 mils, 0.0015 inch (0.038 mm).
- B. Colors and Gloss: As selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify prepared openings and flashings are ready to receive Work and opening dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Provide continuous corrosion protection between dissimilar materials.
- C. Louver systems, including sill flashings, to be installed in accordance with Drawings the manufacturer's recommendations and to shed water to exterior of building envelope.
- D. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior of building envelope.
- E. Sill pan to be embedded in full bed of sealant. Design system such that penetrations in flashings and sill pan are only for the purpose of structural anchoring of louver system.
- F. Fully seal anchor holes and heads to prevent water penetration.
- G. Install louvers level and plumb.
- H. Secure louvers in opening framing with concealed fasteners.
- I. Install bird and insect screen and frame to interior of louver.
- J. Install perimeter sealant and backing rod in accordance with Section 07 90 00.

3.3 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. In accordance with manufacturer's recommendations, strip protective finish coverings and clean surfaces and components.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
1. Interior Gypsum Board.
 2. Exterior Gypsum Board.
 3. Framing.
 4. Suspension Support.
 5. Acoustic Attenuation.
 6. Accessories.
- B. Related Requirements:
1. Section 01 33 00 – Submittal Procedures: Delegated-Design Services.
 2. Section 01 40 00 - Quality Requirements: Mockup requirements indicated in Schedule of Mockups at end of Section 01 40 00.
 3. Section 05 40 00 - Cold-Formed Metal Framing.
 4. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood blocking for support of wall cabinets, toilet accessories and other wall mounted Work.
 5. Section 07 21 00 - Thermal Insulation: Insulation for gypsum board assemblies requiring thermal insulation.
 6. Section 07 90 00 - Joint Protection.
 7. Section 09 30 00 - Tiling: For Tile Backer Board that is to be installed on framing that is provided in this Section.

1.2 REFERENCES

- A. ASTM International (ASTM):
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
 2. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
 3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
 4. ASTM C303 - Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation; 2021.
 5. ASTM C473 - Standard Test Methods for Physical Testing of Gypsum Panel Products; 2019.
 6. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017; Reapproval 2022.
 7. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
 8. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
 9. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.
 10. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
 11. ASTM C834 - Standard Specification for Latex Sealants; 2017, Reapproval 2023.

12. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2023.
 13. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2022.
 14. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
 15. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
 16. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
 17. ASTM C1104/C1104M - Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation; 2019.
 18. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
 19. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018, Reapproval 2023.
 20. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019, Reapproval 2022.
 21. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
 22. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2023.
 23. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, Editorial Changes 2020.
 24. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
 25. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 26. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009, Reapproval 2023.
 27. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C; 2024.
 28. ASTM E970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source; 2017, Editorial Changes 2022.
 29. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Changes 2021.
- B. California Department of Public Health (CDPH):
1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- C. Gypsum Association (GA):
1. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.
 2. GA-600 - Fire Resistance and Sound Control Design Manual; 2021.
- D. International Organization for Standardization (ISO):
1. ISO 11600 - Building Construction - Jointing Products - Classification and Requirements For Sealants; 2002, Amendments 2011.
- E. Intertek Testing Services (ITS):
1. ITS (DIR) - Directory of Listed Products; Current Edition.
- F. Underwriters Laboratories Inc. (UL):
1. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on metal framing; gypsum board and sheathing; joint treatment materials; and acoustic accessories.
- C. Shop Drawings: Indicate special details associated with fireproofing and acoustic accessories.
 - 1. Show type, weight, location, and spacing of members. Clearly identify attachments and connections using AWS symbols for welds, standard designations for fasteners. Show bracing, supplemental strapping, clips, and other accessories required.
 - 2. Delegated Engineering Design: Shop drawings shall be sealed by a licensed Professional Structural Engineer registered in the State in which the project is located and shall include structural calculations verifying compliance with the performance data specified and as noted on the Building Code Data Sheet and Structural requirements on the Drawings. Design is to comply with the provisions of the State Building Code, for the State in which the Work is constructed.
 - a. Provide sealed calculations indicating that design of suspension systems provide compliance with seismic structural requirements indicated in the Performance and Design Requirements article in this Section.
 - b. Verify and coordinate stud depth with the partition schedule on the Drawings. Indicate component details, framed openings, bearing, anchorage, loading, welds, seismic design components, type and location of fasteners, accessories, and items required for the Work.
 - c. Show type, weight, location, and spacing of members. Clearly identify attachments and connections using AWS symbols for welds, standard designations for fasteners. Show bracing, supplemental strapping, clips, and other accessories required.
- D. Samples:
 - 1. Submit two sets of each item indicated in ACCESSORIES article in this Section, illustrating manufacturer's full range of options. Submit for selection by Architect.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three (3) years documented experience.
- C. Delegated Engineering Design: Design all metal stud and cold rolled steel framing using the engineering services of a Professional Structural Engineer experienced in design of this Work and licensed to perform professional engineering services in the State in which the project is located.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: Provide completed assemblies complying with applicable code.
- B. Fire Rated Wall Construction: Wall assembly fire rating to be as indicated on Drawings and as required by building code.
- C. Seismic Design is to comply with requirements for the Seismic Design Category as indicated on the Structural Drawings and Section 00 31 00 - Available Project Information.

- D. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 MANUFACTURERS

- A. Manufacturers:
1. CertainTeed Corporation (CTC).
 2. Georgia-Pacific Gypsum Corporation (GPG).
 3. National Gypsum Company (NGC).
 4. USG Corporation (USG).
 5. Substitutions: Section 01 60 00 - Product Requirements.

2.3 INTERIOR GYPSUM BOARD MATERIAL

- A. Mold Resistant Gypsum Board: ASTM C1396/C1396M; paper faced; maximum available length in place; ends square cut; tapered edges; suitable for finish and paint.
1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
 2. Combustibility: Noncombustible complying with ASTM E136.
 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
 - a. Flame Spread: 15, maximum.
 - b. Smoke Development: 5, maximum.
 - c. Class: Class A.
 4. Water Absorption: 5 percent maximum by weight after two-hour immersion when tested in accordance with ASTM C473.
 5. Mold Growth Resistance: Score of 10 minimum, in accordance with ASTM D3273 for mold growth on interior coatings surface.
 6. Finish Level: Refer to Finish Levels Schedule at end of this Section.
 7. Basis of Design:
 - a. NGC - Gold Bond XP Fire-Shield X.
 8. Locations: All interior gypsum surfaces in the following areas unless indicated otherwise on Drawings.
 - a. All interior gypsum surfaces where no other gypsum board type is indicated.
- B. Abuse and Mold Resistant Gypsum Board: ASTM C1396/C1396M; paper faced; maximum available length in place; ends square cut; tapered edges; suitable for finish and paint.
1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
 2. Combustibility: Noncombustible complying with ASTM E136.
 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
 - a. Flame Spread: 15, maximum.
 - b. Smoke Development: 5, maximum.
 - c. Class: Class A.
 4. Water Absorption: 5 percent maximum by weight after two-hour immersion when tested per ASTM C473.
 5. Mold Resistance: Score of 10 minimum, in accordance with ASTM D3273 for mold growth on interior coatings surface.
 6. Finish Level: Refer to Finish Levels Schedule at end of this Section.
 7. Basis of Design:
 - a. NGC - Gold Bond XP Hi-Abuse.
 - 1) Surface Abrasion: Level 3 minimum, per ASTM C1629/C1629M.
 - 2) Indentation: Level 1 minimum, per ASTM C1629/C1629M.
 - 3) Soft Body Impact: Level 2 minimum, per ASTM C1629/C1629M.
 - 4) Hard Body Impact: Level 1 minimum, per ASTM C1629/C1629M.
 8. Locations: All interior gypsum surfaces in the following areas unless indicated otherwise on Drawings.

- a. All classrooms and rooms of instruction and teaching; minimum height from finish floor to 8 feet above finish floor unless otherwise indicated on Drawings.
- b. Media Center and Learning Commons Areas; minimum height from finish floor to 8 feet above finish floor unless otherwise indicated on Drawings.
- c. All circulation areas, corridors, and passageways; minimum height from finish floor to 8 feet above finish floor unless otherwise indicated on Drawings.
- d. Toilet Areas WITHOUT contiguous shower stalls.
- e. Kitchen Food Preparation Areas.
- f. Kitchen Food Storage Areas.
- g. Food Serving Areas.
- h. Dish Washing Area.
- i. Janitor And Custodian Closets.

2.4 EXTERIOR GYPSUM BOARD MATERIAL

- A. Exterior Soffit Gypsum Board: ASTM C1396/C1396M; maximum available length in place; tapered edges; suitable for finish and paint.
 1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
 2. Combustibility: Noncombustible complying with ASTM E136.
 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
 - a. Flame Spread: 20, maximum.
 - b. Smoke Development: Zero.
 - c. Class: Class A.
 4. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL (FRD) or ITS (DIR) listed.
 5. Comply with ASTM C1396/C1396M for water resistant and exterior gypsum soffit board.
 6. Finish Level: Refer to Finish Levels Schedule at end of this Section.
 7. Basis of Design:
 - a. USG - Sheetrock Mold Tough Firecode X.
 8. Locations: Exterior soffits and ceiling in protected areas unless indicated otherwise on Drawings. Protected areas are surfaces protected from excessive, repetitive or continuous moisture.
- B. Exterior Fiberglass Faced Sheathing Gypsum Board: ASTM C1177/C1177; glass mat faced gypsum substrate; maximum available length in place; tapered edges.
 1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1177/C1177M.
 2. Combustibility: Noncombustible complying with ASTM E136.
 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
 - a. Flame Spread: Zero.
 - b. Smoke Development: Zero.
 - c. Class: Class A.
 4. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly. If no tested assembly is indicated, use Type X board, UL (FRD) or ITS (DIR) listed.
 5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 6. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
 7. Basis of Design:
 - a. NGC - Gold Bond eXP Sheathing Fire-Shield.
 8. Locations: Exterior sheathing unless indicated otherwise on Drawings.

2.5 FRAMING MATERIAL

- A. Thicknesses provided here are minimum and subject to increase by Delegated Engineer's design requirements.
 - 1. Studs: ASTM C645; galvanized sheet steel.
 - a. 0.0312 inch thick, C shape.
 - 2. Runners and Tracks: ASTM C645; galvanized sheet steel.
 - a. 0.0312 inch thick, C shape.
 - 3. Furring, Framing, and Accessories: ASTM C645; galvanized sheet steel.
 - a. 0.0312 inch thick, C shape.
 - 4. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel.
 - a. 0.0312 inch thick, C shape.
- B. Galvanizing: Comply with ASTM A653/A653M zinc-coated hot dipped galvanized steel.
 - 1. Interior Framing: G40.
 - 2. Exterior Framing: G60.
- C. Framed Partition Head To Structure Connections: Provide one of the following types and coordinate to provide fire rated constructed assemblies as indicated on Drawings.
 - 1. Single Long-Leg Runner System: ASTM C645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fitted into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 - 2. Double-Runner System: ASTM C645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 - 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- D. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding strength, and other properties required to fasten steel members to substrates. Use screws with low profile head where board, or other overlay sheathing, is to be applied.
- E. Anchorage to Substrate: Provide tie wire, fasteners, screws, metal supports, and other anchorage devices, of type and size to suit application, and to secure materials to building structural elements.

2.6 SUSPENSION SUPPORT MATERIAL

- A. Suspension Systems: ASTM C635/C635M heavy-duty main beam classification; ASTM A653/A653M zinc-coated hot dipped galvanized steel; ASTM C645 Standard specification for rigid furring channels for screw application of gypsum board.
- B. Accessories: Stabilizer bars, clips, splices, and perimeter moldings required for suspended grid system.
- C. Support Channels and Hangers: Primed steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

2.7 ACOUSTIC ATTENUATION MATERIAL

- A. Acoustic Attenuation Insulation: Install at interior walls and ceilings as indicated on Drawings.
 - 1. Mineral Wool Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit.
 - a. Unfaced Type: ASTM C665 Type-I (unfaced).
 - b. Combustibility: Noncombustible complying with ASTM E136.

- c. Surface Burning Characteristics: When tested in accordance with ASTM E84.
 - 1) Flame Spread: 25, maximum.
 - 2) Smoke Development: 50, maximum.
 - d. Fungi Resistance: Passes when tested in accordance with ASTM C1338.
 - e. Nominal Density: Minimum 2.5 pcf when tested in accordance with ASTM C303.
 - f. Corrosivity to Steel: Passes when tested in accordance with ASTM C665.
 - g. Blanket Width: Sized to fully friction fit space between framing members.
 - h. Blanket Thickness: Sized to fully friction fit cavity, but not less than 3-1/2 inches.
 - i. Manufacturers:
 - 1) Johns Manville.
 - 2) Knauf Insulation.
 - 3) Owens Corning.
 - 4) Rockwool.
- B. Acoustic Sealant: For exposed and concealed joints and annular spaces around through-penetrations. Type to be non-sag, paintable, non-staining latex sealant complying with ASTM C834, ASTM C919 and as follows:
- 1. Sealant to reduce airborne sound transmission through head-of-wall and bottom-of-wall joints and openings to accommodate through-penetrations in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
 - 2. Sound Transmission Class: Sealant to maintain STC ratings at sound rated partitions as indicated on the drawings.
 - 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
 - a. Flame Spread: 10, maximum.
 - b. Smoke Development: 10, maximum.
 - 4. Mold and Mildew Resistance: Rating of zero (0), “no growth”, in accordance with ASTM G21.
 - 5. Movement Capability: 10 percent minimum, in accordance with ISO 11600.
 - 6. Sealant materials and methods shall conform to applicable governing codes and authorities having jurisdiction.
 - 7. Maximum volatile organic compound content to be in accordance with CDPH Standard Method VOC V1.2.
 - 8. Basis of Design: As indicated on Drawings.
- C. Acoustic Sprays: For exposed and concealed locations; sprayable latex material complying with ASTM C919 and the following:
- 1. Spray to reduce airborne sound transmission through head-of-wall joints in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
 - 2. Sound Transmission Class: Spray to maintain STC ratings at sound rated partitions as indicated on the drawings.
 - 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
 - a. Flame Spread: 10, maximum.
 - b. Smoke Development: 10, maximum.
 - 4. Mold and Mildew Resistance: Rating of zero (0), “no growth”, in accordance with ASTM G21.
 - 5. Movement Capability: 10 percent minimum, in accordance with ISO 11600.
 - 6. Spray materials and methods shall conform to applicable governing codes and authorities having jurisdiction.
 - 7. Maximum volatile organic compound content to be in accordance with CDPH Standard Method VOC V1.2.
 - 8. Basis of Design: As indicated on Drawings.

2.8 ACCESSORIES

- A. Finishing Trim: To be metal conforming to ASTM A653/A653M, ASTM A1003/A1003M, ASTM C1047, unless otherwise indicated. Includes trims such as corner beads, edge trim, control joints and expansion joints.
 - 1. Types: As detailed or required for finished appearance.
 - a. Continuous finishing bead profile required for termination and protection of gypsum board finish compound edge.
 - b. J-trim, without bead, is not permitted at gypsum board termination edge unless indicated on Drawings.
 - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
- B. Rigid Vinyl: Vinyl trim permitted only as follows, or where noted as vinyl on Drawings.
 - 1. Gypsum Board Termination at Dissimilar Surface: L-trim with tear-away strip.
 - a. Manufacturers:
 - 1) Trim-Tex - Tear Away L-Bead.
 - 2) Phillips Manufacturing Company - GripStik L-Tear.
 - 3) MarinoWare - L-Tear Strip
- C. Extruded Aluminum:
 - 1. Clear finished for Exposed Gypsum Board Edge Trim Bead:
 - a. L-trim molding with finish bead.
 - b. Basis of Design: Fry Reglet - "L" Trim Molding.
- D. Expansion Joints:
 - 1. Type: Accordion profile with factory-installed protective tape.
- E. Control Joints:
 - 1. Type: V-shaped metal with factory-installed protective tape.
- F. Joint Materials: ASTM C475/C475M; reinforcing tape, joint compound, and water.
 - 1. Joint Tape:
 - a. Fiberglass Tape: 2 inch (50 mm) wide, open-weave coated glass fiber tape for joints and corners, except as otherwise indicated.
 - 2. Joint Compound:
 - a. Drying-Type: Vinyl-based, ready-mixed.
- G. Screws for Fastening Board Materials to Steel Framing Members:
 - 1. Gypsum Board: Use S-Type screws complying with the following.
 - a. Metal thickness from 0.033 to 0.112 inch: ASTM C954; steel drill screws, corrosion resistant.
 - b. Metal thickness less than 0.033 inch: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- H. Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent unless otherwise indicated on Drawings.
 - 1. Finish and color to be selected by Architect for manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.

- B. Verify site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION - GENERAL

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Installation requirements in this Section are minimum requirements and are subject to more stringent requirements as may be indicated in the design by the Delegated Engineering Design.
- C. SUPPORT AND ANCHOR FRAMING SYSTEMS TO FLOOR SYSTEM BELOW AND BUILDING STRUCTURAL MEMBERS ABOVE. DO NOT SUSPEND, SUPPORT, OR ANCHOR FRAMING SYSTEMS TO NON-STRUCTURAL BUILDING ELEMENTS ABOVE SUCH AS ROOF DECKING AND FLOOR DECKING. DO NOT ALLOW ANCHORS OR SUPPORTS TO TOUCH OR DAMAGE EMBEDDED, CONCEALED OR VISIBLE WORK SUCH AS HVAC, ELECTRICAL, AND PLUMBING COMPONENTS.
- D. Environmental Limitations: Install gypsum board, joint treatment materials, finish materials, and adhesives in accordance with ASTM C840 requirements and gypsum board manufacturer's written recommendations.
- E. Do not install panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.4 METAL FRAMING INSTALLATION

- A. Install metal framing in accordance with GA-216, GA-600, ASTM C754, and manufacturer's recommendations.
- B. Wall Framing:
 - 1. Metal stud spacing to be 16 inches on center, minimum.
 - 2. Refer to Drawings for indication of partitions extending stud framing through ceiling to structure above. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.
 - 3. Door Opening Framing: Reinforce openings as required to withstand the forces imposed by the weight and operation of specified doors or operable panels, using not less than double studs at jambs and increased reinforcing as needed.
 - 4. Blocking: Screw wood blocking to studs. Install blocking as required for support of wall mounted construction, devices, and equipment similar to, but not limited to, the following:
 - a. Toilet partitions and accessories; cabinet units; visual display surfaces; televisions and monitors; handrails; fixtures.
- C. Wall Furring:
 - 1. Erect wall furring for direct attachment to concrete masonry walls.

2. Erect furring channels vertically; space maximum 24 inches o.c., not more than 4 inches from abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
 3. Erect metal stud framing spaced 1/2 inches from concrete masonry walls, attached by adjustable furring brackets.
 4. Wall Furring for Fire Ratings: Install furring as required for fire resistance ratings indicated and to GA-600 requirements.
- D. Ceiling Framing:
1. Coordinate location of hangers with other work.
 2. Install ceiling framing independent of walls, columns, and above ceiling work.
 3. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.
 4. Laterally brace entire suspension system.

3.5 ACOUSTIC ACCESSORIES INSTALLATION

- A. Install acoustic accessories in accordance with GA-600 as related to sound control.
- B. Acoustic Attenuation Insulation: Friction fit insulation within framing cavity in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions. Thickness to be as required to fill cavity.
- C. Acoustic Sealant and Spray:
1. General: Comply with Drawings and acoustic sealant and spray manufacturer's written installation instructions for products and applications indicated.
 2. Standards: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.
 3. Install acoustic sealant backings of type indicated to support sealant and spray during application in accordance with manufacturer's written installation instructions.
 4. Install acoustic sealant and spray free of air pockets, embedded foreign matter, sags and ridges.
 5. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - a. Remove excess acoustic sealant from surfaces adjacent to joint.
 - b. Remove excess acoustic spray from surfaces adjacent to joint as indicated on the drawings.
 - c. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - d. Provide concave joint configuration unless otherwise indicated.

3.6 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with ASTM C840, and GA-216.
- B. Gypsum Board:
1. Use screws when fastening gypsum board to metal furring or framing.
 2. Erect single layer gypsum board in most economical direction, with ends and edges occurring over firm bearing. Exception as follows:
 - a. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.

3. Erect exterior gypsum sheathing in accordance with ASTM C1280, horizontally, with edges butted and ends occurring over firm bearing.
4. Double Layer Applications: Secure second layer to first with fasteners. Place second layer parallel to first layer. Offset joints of second layer from joints of first layer.
5. Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.
6. Control Joints: Construct control joint in accordance with the drawings, GA-216, and as follows:
 - a. Place control joints consistent with lines of building space and features. When not indicated in the drawings, install control joints per GA-216 and as follows:
 - 1) Not more than 30 feet apart on walls over 50 feet long.
 - 2) At ceilings, not more than 30 feet apart in both directions.
 - 3) At interior and exterior gypsum and stucco soffits and bulkheads, at all inside corners of vertical surfaces not more than 30 feet apart on vertical and horizontal surfaces. Control joints installed on vertical surfaces shall continue, in alignment/direction and through corner finish, onto contiguous horizontal surface of like material (like treatment from horizontal surfaces to contiguous vertical surfaces).
 - 4) At interior and exterior soffits and bulkheads, not more than 30 feet apart on vertical and horizontal surfaces. Control joints installed on vertical surfaces shall continue, in alignment/direction and through corner finish, onto contiguous horizontal surface of like material (like treatment from horizontal surfaces to contiguous vertical surfaces).
7. Place corner beads at external corners. Use longest practical length.
8. Edge Trim: Install LC Bead edge trim at locations where gypsum board abuts dissimilar materials. Allow appropriate space for application of appropriate sealant to seal and bridge between the gypsum finished edge trim and the dissimilar material.
9. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations shown on the drawings. Provide vent area indicated.

3.7 JOINT TREATMENT AND FINISH

- A. Finish gypsum board materials in accordance with ASTM C840 and to Finish Level as indicated in Schedule at end of this Section.
- B. Fiberglass Joint Tape: Embed and finish with setting-type joint compound in the following locations and as otherwise recommended by board manufacturer for application conditions.
 1. Exterior Locations: All exterior locations.
 2. Interior Locations: Tile backer board locations.
 3. All Glass Mat Faced Board Locations: Interior and exterior.
- C. Paper Joint Tape: Embed with drying-type joint compound and finish with drying-type joint compound in the following locations.
 1. Exterior Locations: No paper joint tape to be used.
 2. Interior Locations: To be used at locations where fiberglass joint tape is not indicated.
- D. Tape, fill and sand joints, edges and corners, ready to receive finishes.
- E. Glass Mat Faced Gypsum Board Surfaces:
 1. Use fiberglass joint tape, embed and finish with setting type joint compound.
 2. Provide full surface skim coat finishing as required to conceal and prevent telegraphing of glass mat texture, resulting in a smooth surface finish.

3.8 SHAFT WALL INSTALLATION

- A. Install in accordance with manufacturer's installation instructions, GA-216, GA-600, and ASTM C754.
- B. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
- C. Install studs at spacing required to meet performance requirements.
- D. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.
 - 1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
 - 2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

3.9 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation of Finished Gypsum Board Surface from Flat Surface: 1/8 inch in 10 feet in any direction.

3.10 SCHEDULES

- A. Finish Levels Schedule: Gypsum finish levels to be in accordance with ASTM C840:
 - 1. Level 1: Surfaces above finished ceilings and concealed from view.
 - 2. Level 5: All surfaces exposed to view (includes GWB that is painted or covered with adhered wall covering sheet materials).

END OF SECTION

SECTION 09 30 00**TILING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Floor Tile and setting applications.
 - 2. Wall Tile and setting applications.
 - 3. Trim and accessories.
 - 4. Tile Backer Board.
 - 5. Accessories.
- B. Related Requirements:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Substrate for floor tile.
 - 2. Section 04 20 00 - Unit Masonry: Substrate for wall tile.
 - 3. Section 09 21 16 - Gypsum Board Assemblies: Framing and support construction for installation of tiling backer board specified in this Section.

1.2 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI):
 - 1. ANSI A108/A118/A136 - Installation of Ceramic Tile; 2021:
 - a. Includes ANSI A108.01, .02, .1A, .1B, .1C, .4, .5, .6, .8, .9, .10, .11, .12, .13, .14, .15, .16, .17, .18, and 21 - defines the installation of ceramic tile.
 - 1) ANSI A108.1A - Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
 - 2) ANSI A108.1B - Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar.
 - 3) ANSI A108.11 - Interior Installation of Cementitious Backer Units.
 - 4) ANSI A108.13 - Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
 - 5) ANSI A108.17 - Installation of Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone.
 - b. Includes ANSI A118.1, .3, .4, .5, .6, .7, .8, .9, .10, .11, .12, .13, .15, .16, and ANSI A136 - defines the test methods and physical properties for ceramic tile installation materials.
 - 1) ANSI A118.1 - Dry-Set Cement Mortar.
 - 2) ANSI A118.3 - Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
 - 3) ANSI A118.4 - Modified Dry-Set Cement Mortar
 - 4) ANSI A118.5 - Chemical Resistant Furan Mortars and Grouts for Tile Installation.
 - 5) ANSI A118.6 - Standard Cement Grouts for Tile Installation.
 - 6) ANSI A118.7 - High Performance Cement Grouts for Tile Installation.
 - 7) ANSI A118.8 - Modified Epoxy Emulsion Mortar/ Grout.
 - 8) ANSI A118.9 - Test Methods and Specifications for Cementitious Backer Units.
 - 9) ANSI A118.10 - Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.

- 10) ANSI A118.11 - EGP (Exterior Glue Plywood) Modified Dry-Set Mortar.
 - 11) ANSI A118.12 - Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
 - 12) ANSI A118.15 - Improved Modified Dry-Set Cement Mortar.
 - 13) ANSI A136.1 - Organic Adhesives for installation of Ceramic Tile.
 2. ANSI A137.1 - Standard Specification for Ceramic Tile; 2022.
 3. ANSI A137.2 - Standard Specifications for Glass Tile; 2022.
- B. ASTM International (ASTM):
1. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
 2. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2020.
 3. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018, Reapproval 2023.
 4. ASTM C650 - Standard Test Method for Resistance of Ceramic Tile to Chemical Substances; 2020.
 5. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
 6. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
 7. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.
 8. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2017.
 9. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2022.
 10. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
 11. ASTM D2394 - Standard Test Methods for Simulated Service Testing of Wood and Wood-Based Finish Flooring; 2017, Reapproval 2022.
 12. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
 13. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications; 2016.
 14. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023a.
 15. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2022, Editorial Changes 2023.
 16. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C; 2022.
 17. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Changes 2021.
- C. Tile Council of North America (TCNA):
1. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2023.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this Section; require attendance by all affected installers.

1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets on tile, mortar, grout, and accessories. Include manufacturer's recommendations for using installation of system components including, but not limited to, tile, setting materials, accessories, trim, grouts, and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, trim shapes and locations, junctions with dissimilar materials, control and expansion joints, termination edge conditions, accessories, areas receiving waterproofing membrane, and setting details.
- D. Samples for Initial Selections: Two manufacturer's complete set of color samples illustrating the full range of finishes, textures, and colors available for each product; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, texture, and color; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Include recommended polishes, waxes and other restorative/protective products and methods.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with ANSI A108/A118/A136 and TCNA (HB).
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, with minimum ten (10) years of documented experience.
- C. Installer Qualifications: Company specializing in performing tile installation, with minimum of five (5) years of documented experience.
- D. Prior to grouting, prepare and protect the finish surfaces of tile work as needed to prevent staining of tile work during the grouting process and cleanup. Tile work that is stained by grout or other material is not acceptable tile work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect adhesives and other temperature sensitive materials from freezing or overheating in accordance with manufacturer's instructions.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during installation of mortar materials.

1.9 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 - 1. Five percent (5%) full size units of each product type, size, color, shape, profile, and surface finish combination installed, but no less than the following:
 - a. Twenty (20) square feet of field tiles.
 - b. Five (5) units of each trim and accessory.
 - c. Sixteen (16) linear feet of each type and color non-ceramic trim.
 - d. Sixteen (16) linear feet of threshold.

PART 2 PRODUCTS

2.1 TILE

- A. Manufacturers: All products of each type by the same manufacturer.
 - 1. Crossville Tile Company: www.crossvilleinc.com.
 - 2. Daltile Corporation: www.daltile.com.
 - 3. Trinity Tile: www.trinitytile.com.
 - 4. Other manufacturers as may be indicated on Drawings.
 - 5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Porcelain Floor Tile: ANSI A137.1, Standard Grade.
 - 1. Moisture Absorption: 0.5 to 3.0 percent, tested in accordance with ASTM C373.
 - 2. Basis of Design:
 - a. As indicated on Drawings.
 - 3. Colors:
 - a. As indicated on Drawings.
 - 4. Grout Joints Size:
 - a. As recommended by manufacturer.
 - 5. Sizes:
 - a. As indicated on Drawings.
 - 6. Thickness: As indicated on Drawings, but not less than 3/8 inch.
 - 7. Shapes:
 - a. As indicated on Drawings.
 - 8. Edges:
 - a. Cushioned, unless indicated otherwise on Drawings.
 - 9. Surface Finishes:
 - a. As indicated on Drawings.
 - 10. Patterns:
 - a. As indicated on Drawings.
 - 11. Tile Trim: Refer to TRIM AND ACCESSORIES article in this Section.
- C. Porcelain Wall Tile: ANSI A137.1, Standard Grade.
 - 1. Moisture Absorption: 0.5 to 3.0 percent, tested in accordance with ASTM C373.
 - 2. Basis of Design:
 - a. As indicated on Drawings.
 - 3. Colors:
 - a. As indicated on Drawings.
 - 4. Grout Joints Size:
 - a. As recommended by manufacturer.
 - 5. Sizes:
 - a. As indicated on Drawings.
 - 6. Thickness: As indicated on Drawings, but not less than 3/8 inch.

7. Shapes:
 - a. As indicated on Drawings.
 8. Edges:
 - a. Cushioned, unless indicated otherwise on Drawings.
 9. Surface Finishes:
 - a. As indicated on Drawings.
 10. Patterns:
 - a. As indicated on Drawings.
 11. Tile Trim: Refer to TRIM AND ACCESSORIES article in this Section.
- D. Ceramic Floor Tile: ANSI A137.1, Standard Grade.
1. Moisture Absorption: 0.5 to 3.0 percent, tested in accordance with ASTM C373.
 2. Basis of Design:
 - a. As indicated on Drawings.
 3. Colors:
 - a. As indicated on Drawings.
 4. Grout Joints Size:
 - a. As recommended by manufacturer.
 5. Sizes:
 - a. As indicated on Drawings.
 6. Thickness: As indicated on Drawings, but not less than 1/4 inch.
 7. Edges:
 - a. Cushioned, unless indicated otherwise on Drawings.
 8. Surface Finishes:
 - a. As indicated on Drawings.
 9. Patterns:
 - a. As indicated on Drawings.
 10. Tile Trim: Refer to TRIM AND ACCESSORIES article in this Section.
- E. Ceramic Wall Tile: ANSI A137.1, Standard Grade.
1. Moisture Absorption: 7.0 to 20.0 percent, tested in accordance with ASTM C373.
 2. Basis of Design:
 - a. As indicated on Drawings.
 3. Colors:
 - a. As indicated on Drawings.
 4. Grout Joints Size:
 - a. As recommended by manufacturer.
 5. Sizes:
 - a. As indicated on Drawings.
 6. Thickness: As indicated on Drawings, but not less than 1/4 inch.
 7. Edges:
 - a. Cushioned, unless indicated otherwise on Drawings.
 8. Surface Finishes:
 - a. As indicated on Drawings.
 9. Patterns:
 - a. As indicated on Drawings.
 10. Tile Trim: Refer to TRIM AND ACCESSORIES article in this Section.
- F. Quarry Tile: ANSI A137.1, Standard Grade.
1. Moisture Absorption: 0.5 to 3.0 percent, tested in accordance with ASTM C373.
 2. Chemical Resistance: Resistant, tested in accordance with ASTM C650.
 3. Basis of Design:
 - a. Daltile - Quarry Textures.
 4. Colors:
 - a. To be selected by Architect from submitted samples.

5. Grout Joints Size:
 - a. As recommended by manufacturer.
6. Sizes:
 - a. As indicated on Drawings, but not less than 6 x 6 inches.
7. Thickness: As indicated on Drawings, but not less than 1/2 inch.
8. Edges:
 - a. Cushioned, unless indicated otherwise on Drawings.
9. Surface Finishes:
 - a. Slip-resistant.
 - b. Raised abrasive grain.
10. Patterns:
 - a. As indicated on Drawings.
11. Tile Trim: Refer to TRIM AND ACCESSORIES article in this Section.

2.2 TRIM AND ACCESSORIES

- A. Base Tile Trim Units - For Quarry Floor Tile.:
 1. Top Open Edges: Bullnosed open edge.
 2. Bottom:
 - a. Cove; edge to match floor tile edge type for flush transition.
 3. Inside Corners:
 - a. Cove
 4. Outside Open Corners:
 - a. Bullnosed open edge and provide single outcorner shape to include smooth cove transition.
 5. Same manufacturer and color as floor tile type.
 6. Lengths and Joints:
 - a. Match lengths and joints with adjacent floor tile joints.
 7. Height: 6 inches.
- B. Non-Ceramic Trim Components:
 1. Applications:
 - a. Porcelain Floor Tile Trim.
 - b. Porcelain Wall Tile Trim.
 - c. Ceramic Wall Tile Trim.
 2. Locations as follows unless indicated otherwise on Drawings.
 - a. Open edges of wall tile.
 - b. Open edges of floor tile.
 - c. Outside wall corners.
 - d. Transitions between floor finishes of different heights and dissimilar types.
 - e. Expansion and control joints.
 - f. Floor to wall joints.
 - g. Borders and other trim as indicated on Drawings.
 3. Basis of Design:
 - a. Schluter-Systems; www.schluter.com.
 4. Trim Material Type:
 - a. Extruded Aluminum: Factory finished.
 5. Profile Design:
 - a. To be selected by Architect from manufacturer's full range of options.
 6. Lengths: Full lengths as manufactured.
 7. Finish and Colors:
 - a. To be selected by Architect from submitted samples.
 8. Setting Materials:
 - a. As recommended by Trim and Tile Manufacturers for applicable substrates.

- C. Floor Tile Thresholds:
 - 1. Locations as follows, unless indicated otherwise on Drawings.
 - a. Doorways where tile terminates.
 - b. Open edges of floor tile where adjacent finish floor is dissimilar flooring material or is at different height.
 - 2. Marble, White Carrara color, honed finish; 2 inches wide by full width of wall or frame opening; both top edges beveled full length; without holes, cracks, or open seams.
 - a. Thickness as required such that the finish top of adjacent flooring and top of threshold are as indicated on Drawings.

2.3 SETTING MATERIALS

- A. Bond Coat Materials: As recommended by tile manufacturer and TCNA for substrate types and installation conditions.
 - 1. Latex/Polymer Modified Portland Cement Mortar:
 - a. Complying with ANSI A118.4.
 - 2. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar:
 - a. Application: Bond coat for large tiles with at least one side measuring 15 inches or greater.
 - b. Complying with ANSI A118.4H.
 - c. Approved by manufacturer for application thickness 3/32 inch to 1/2 inch.
 - d. Manufacturers:
 - 1) Laticrete International, Inc. - LHT Plus.
 - 2) Mapei Corporation - Ultraflex LHT.
 - 3) H.B. Fuller Corporation, Inc. - TEC PermaFlex 300 LHT Mortar.
- B. Mortar Bed Materials: Thick-set mortar bed setting method.
 - 1. Pre-packaged or field-mixed; complying with ANSI A108.1A and ANSI A108.1B; includes portland cement, sand, latex additive, and water.

2.4 GROUT AND JOINT MATERIALS

- A. Manufacturers:
 - 1. Ardex Engineered Cements: www.ardexamericas.com/#sle.
 - 2. Custom Building Products: www.custombuildingproducts.com/#sle.
 - 3. Laticrete International, Inc.: www.laticrete.com/#sle.
 - 4. MAPEI Corporation: www.mapei.com.
 - 5. Merkrete, by Parex USA, Inc.: www.merkrete.com/#sle.
- B. High Performance Cement Grout: ANSI A118.7, polymer modified cement grout.
 - 1. Applications:
 - a. 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; if joint design is indicated to be less than 1/8 inch wide, use unsanded grout.
 - 3. Color(s): To be selected by Architect from full range of colors
 - 4. Basis of Design: Laticrete PermaColor Grout.
- C. Epoxy Grout: ANSI A118.3, chemical resistant and water-cleanable epoxy grout.
 - 1. Applications:
 - a. All Quarry Tile work.
 - 2. Use sanded grout for joints 1/8 inch wide and larger; if joint design is indicated to be less than 1/8 inch wide, use unsanded grout.
 - 3. Color(s): To be selected by Architect from full range of colors.
 - 4. Basis of Design: Laticrete SpectraLock Pro Premium.

- D. Tile Joint Sealant: Gunable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
1. Applications: Control joints; tile surface change of plane; tile abutment joints to dissimilar materials such as, but not limited to, door frames, drains, gypsum wall board, concrete masonry units, and plumbing pipe penetrations.
 2. Color: Match grout color.
 3. Use sanded type for joints designed to be 1/8 inch or wider.
 4. Use unsanded type for joints designed to be less than 1/8 inch.
 5. Products: Same manufacturer as grout material or as per written recommendation from grout manufacturer.
- E. Grout Joint Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
1. Composition: Water-based colorless silicone.
 2. Products: Same manufacturer as grout material or as per written recommendation from grout manufacturer.

2.5 TILE BACKER BOARD MATERIAL

- A. Cement Backer Board: Non-gypsum-based; aggregated portland cement backer board with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325 (Type A or B, depending on application as follows).
1. Application:
 - a. ASTM C1325 (Type A): Exterior applications.
 - b. ASTM C1325 (Type B): Interior applications and exterior soffit applications.
 2. Coordination: Coordinate material and installation with compatibility and requirements for tiling systems and manufacturer's recommendations.
 3. Combustibility: Noncombustible complying with ASTM E136.
 4. Surface Burning Characteristics: When tested in accordance with ASTM E84.
 - a. Flame Spread: Zero.
 - b. Smoke Development: Zero.
 - c. Class: Class A.
 5. Mold Resistance:
 - a. Score of 10, when tested in accordance with ASTM D3273.
 - b. Rating of zero for mold growth when tested in accordance with ASTM G21.
 6. Compressive Strength: 1,250 psi minimum, when tested in accordance with ASTM D2394.
 7. Thickness:
 - a. Interior Use: 5/8 inch.
 - b. Exterior Use: 5/8 inch.
 8. Spacing of support framing members to be as recommended by board manufacturer, but no greater than 16 inches OC.
 9. Screws for Fastening Board Materials to Steel Framing Members:
 - a. Non-corrosive type and in compliance with ANSI 108.11.
 10. Joint Tape and Finish Compound: Comply with ANSI 108.11 and as recommended by backer board manufacturer for compatibility with subsequent applied materials.
 - a. Do not use paper tape or gypsum joint compound.
 - b. Joint tape to be coated glass fiber mesh type and as recommended by backer board manufacturer for application conditions.
 11. Manufacturer:
 - a. USG - Durock Cement Board with EdgeGuard. (Basis of Design)
 - b. NGC - PermaBase Cement Board.
 12. Locations: Framed construction indicated to receive tile finish.

- a. Wet Areas: Includes tile areas at tubs, showers, floor sinks and where otherwise indicated on Drawings.
- b. Other framed construction locations where the Drawings do not indicate backer board material type to be gypsum type.

2.6 ACCESSORY MATERIALS

- A. Waterproofing Membrane: Provide membrane system designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10 (waterproofing).
 1. Fluid or Trowel Applied Type:
 - a. Membrane Material: Synthetic rubber.
 - b. Thickness:
 - 1) 40 mils (1.00 mm), minimum, dry film thickness.
 - c. Products:
 - 1) Custom Building Products: RedGard Crack Prevention and Waterproofing Membrane: www.custombuildingproducts.com
 - 2) Laticrete International, Inc.: Laticrete Hydro Ban: www.laticrete.com
 - 3) Merkrete, by Parex USA, Inc.: Merkrete Hydro Guard 2000: www.merkrete.com
 - 4) TEC, an H.B. Fuller Construction Products Brand; TEC HydraFlex Waterproofing Crack Isolation Membrane: www.tecspecialty.com
 2. Crack Isolation Reinforcing Fabric: Fabric type as recommended by waterproofing membrane manufacturer.
 3. When both a Crack Isolation Membrane and a Waterproofing Membrane are indicated, both membranes are to be manufactured by same manufacturer and designed to be compatible with each other, the substrate, and the subsequent applied materials.
- B. Crack Isolation Membrane: Provide membrane system designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.12 (crack isolation).
 1. Fluid or Trowel Applied Type:
 - a. Membrane Material: Synthetic rubber.
 - b. Thickness:
 - 1) 40 mils (1.00 mm), minimum, dry film thickness.
 - c. Products:
 - 1) Custom Building Products: RedGard Crack Prevention and Waterproofing Membrane: www.custombuildingproducts.com
 - 2) Laticrete International, Inc.: Laticrete Hydro Ban: www.laticrete.com
 - 3) Merkrete, by Parex USA, Inc.: Merkrete Hydro Guard 2000: www.merkrete.com
 - 4) TEC, an H.B. Fuller Construction Products Brand; TEC HydraFlex Waterproofing Crack Isolation Membrane: www.tecspecialty.com
 2. Crack Isolation Reinforcing Fabric: Fabric type as recommended by crack isolation membrane manufacturer.
 3. When both a Crack Isolation Membrane and a Waterproofing Membrane are indicated, both membranes are to be manufactured by same manufacturer and designed to be compatible with each other, the substrate, and the subsequent applied materials.
- C. Cleavage Membrane: ANSI A108.02.
 1. Polyethylene Sheeting: 4 mil (0.1 mm) thickness; complying with ASTM C171 or ASTM D4397.
 - a. Application: Under mortar bed of thick mortar bed tile installation method.

- D. Reinforcing Metal Fabric: ANSI A108.02.
 - 1. Welded Wire Fabric: 2 x 2 inches (51 by 51 mm) size weave of 16/16 wire size; welded fabric; galvanized steel; complying with ASTM A1064/A1064M.
 - a. Application: Suspended in mortar bed of thick mortar bed tile installation method.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrates to be tiled are sound, smooth, and flat within the tolerances specified for that type of work and are ready to receive tiling.
- C. Verify that cracks in substrates to be tiled can be repaired, to include compatible crack isolation membrane, as required to prevent defects from occurring in the tiling work and finish. Remove and replace defective substrate materials.
- D. Verify that sufficient solid anchorage materials are installed for anchoring other work elements that are to be secured through tile.
- E. Verify that substrates to be tiled are dust-free and free of substances that could impair bonding of membrane and setting materials to substrate surfaces.
- F. Verify that substrate slopes to drains where floor drains are indicated in contract documents.
- G. For mortar bed method of tile installation, verify that sub-floor is recessed deep enough to accommodate mortar bed thickness variations to achieve slope to floor drains.
- H. Verify the locations of areas that are to receive specified waterproofing membrane prior to proceeding with thin-set method and mortar bed method of tile installations.
- I. Verify that concrete and CMU substrates are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by manufacturers of tile system components.
- J. Verify that required floor-and wall mounted utilities and devices are at correct location, alignment, and elevation.
- K. Verify that floor drains are aligned as indicated on Drawings. If alignment is not indicated on Drawings, aligned parallel with tile pattern joint lines.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect surrounding work from damage.
- D. Vacuum clean surfaces and damp clean.
- E. Seal substrate surface cracks with filler compatible with tiling system components. Level existing substrate surfaces to acceptable flatness tolerances.
- F. Prepare substrate surfaces for installation of waterproofing and crack isolation membrane in accordance with membrane manufacturer's instructions.
- G. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.3 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

3.4 INSTALLATION - GENERAL

- A. Install tile, transition and termination trim, accessories, setting materials, grout, joint sealants, and all tile work components in accordance with applicable requirements of ANSI A108/A118/A136, product manufacturer's instructions, TCNA (HB) recommendations, and the Drawings.
- 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, base, and wall joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size.
- E. Wall Corners: Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Install thresholds where indicated on Drawings and at floor tile open edges.
- H. Sound test tiles after setting. Replace hollow sounding tiles that are not fully bonded to substrate.
- I. Construct expansion, movement, control, contraction, perimeter, and soft joints in compliance with the applicable TCNA (HB) Methods prescribed for joint construction type indicated.
 - 1. Keep such joints free of mortar, grout, adhesive and debris that can interfere with application of final joint construction components.
- J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- K. Prior to grouting, prepare and protect the finish surfaces of tile work as needed to prevent staining of tile work during the grouting process and cleanup. Tile work that is stained by grout or other material is not acceptable tile work.
- L. Grout tile joints unless otherwise indicated. Grout joints to be without voids, cracks, excess mortar or excess grout, or too little grout.
- M. Tile Sealant Application: Use tile joint sealant instead of grout at the following locations.
 - 1. Tile changes in plane and tile-to-tile control joints. Use either bond breaker tape or backer rod as appropriate to prevent sealant from bonding to tiled substrate.
 - 2. Tile abutment joints to dissimilar materials such as door frames, drains, GWB, CMU, and penetrations such as plumbing piping and countertop support brackets.
- N. Apply grout sealer in accordance with grout and tile manufacturers' instructions.

3.5 INSTALLATION - TILE BACKER BOARD

- A. Install panels and finish joints and fastener locations according to ANSI A108.11 and backer board manufacturer's written instructions for type of application indicated.

3.6 INSTALLATION - CRACK ISOLATION MEMBRANE

- A. Install components to comply with ANSI A108.17 (crack isolation), and manufacturer's written instructions.
- B. Existing Cracks: Comply with TCNA Method F125-Partial; bridging existing cracks and include use of crack isolation reinforcing fabric.
- C. Full Substrate Coverage: Comply with TCNA Method F125-Full; full substrate coverage.
 - 1. Include bridging existing cracks; TCNA Method F125-Partial.
 - 2. Membrane to be uniform thickness and bonded securely to substrate.
 - 3. Allow membrane to cure before installing tile or setting materials.

3.7 INSTALLATION - WATERPROOFING MEMBRANE

- A. Install components to comply with ANSI A108.13 (waterproofing), and manufacturer's written instructions.
- B. Existing Cracks: Comply with TCNA Method F125-Partial for bridging existing cracks and include use of crack isolation reinforcing fabric.
- C. Full Substrate Coverage:
 - 1. Include bridging existing cracks; TCNA Method F125-Partial.
 - 2. Membrane to be waterproof, uniform thickness and bonded securely to substrate.
 - 3. Allow membrane to cure and verify waterproof condition by testing before installing tile or setting materials.
- D. Transition of waterproofing membrane from floor tile to wall:
 - 1. Extend continuous floor membrane up behind wall base tile.
 - 2. Extend continuous floor membrane up behind wall tile.
 - a. Where Drawings indicate wall tile to be "without" waterproofing membrane, extend membrane up behind wall tile 4 inches from floor.
- E. Transition of waterproofing membrane from shower area to floor tile beyond where floor tile beyond is indicated to be "without" waterproofing membrane:
 - 1. Extend continuous floor membrane beyond shower curtain line minimum 36 inches in front of shower and 24 inches left and right of shower opening, and up behind wall base tile contiguous to the extended membrane areas. Feather membrane edges at perimeters of extended membrane areas.

3.8 INSTALLATION - INTERIOR FLOORS: THIN-SET METHOD

- A. To be used at locations where concrete substrate IS NOT DEPRESSED.
- B. TCNA Method F122: On-ground concrete.
 - 1. Locations: Wet areas and as indicated here; otherwise use TCNA Method F113.
 - a. Showers (all tiling surfaces).
 - b. Wash Basins (all tiling surfaces).
 - c. Group Toilet Rooms (floor tiling and wall base tiling only).
 - d. Single Occupancy Toilet Rooms (floor tiling and wall base tiling only).
 - e. Locker and Dressing Rooms (floor tiling and wall base tiling only).
 - f. Dishwashing Areas (floor tiling and wall base tiling only).
 - g. Food Preparation Areas (floor tiling and wall base tiling only).
 - h. Mechanical Rooms (floor tiling and wall base tiling only).
 - i. Areas with similar surfaces subject to periods of running or standing water.
 - j. Other areas indicated on Drawings to receive waterproofing membrane.
 - 2. Waterproofing Membrane; ANSI A118.10.
 - 3. Crack Isolation Membrane; ANSI A118.12.
 - a. TCNA Method F125-Partial with crack isolation reinforcing fabric.
 - 4. Bonding Coat:

- a. Latex/Polymer Modified Portland Cement Mortar; ANSI A118.4.
 - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
 5. Grout:
 - a. High Performance Cement Grout; ANSI A118.7.
- C. TCNA Method F122A: Above-ground concrete.
 1. Locations: Wet areas and as indicated here; otherwise use TCNA Method F113A.
 - a. Showers (all tiling surfaces).
 - b. Wash Basins (all tiling surfaces).
 - c. Group Toilet Rooms (floor tiling and wall base tiling only).
 - d. Single Occupancy Toilet Rooms (floor tiling and wall base tiling only).
 - e. Locker and Dressing Rooms (floor tiling and wall base tiling only).
 - f. Dishwashing Areas (floor tiling and wall base tiling only).
 - g. Food Preparation Areas (floor tiling and wall base tiling only).
 - h. Mechanical Rooms (floor tiling and wall base tiling only).
 - i. Areas with similar surfaces subject to periods of running or standing water.
 - j. Other areas indicated on Drawings to receive waterproofing membrane.
 2. Waterproofing Membrane; ANSI A118.10.
 3. Crack Isolation Membrane; ANSI A118.12.
 - a. TCNA Method F125-Partial with crack isolation reinforcing fabric.
 4. Bonding Coat:
 - a. Latex/Polymer Modified Portland Cement Mortar; ANSI A118.4.
 - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
 5. Grout:
 - a. High Performance Cement Grout; ANSI A118.7.
- D. TCNA Method F113: On-ground concrete.
 1. Locations:
 - a. Locations that ARE NOT indicated to receive waterproofing membrane in this Section or on Drawings.
 - b. Locations that ARE NOT indicated to be installed with other TCNA Method.
 2. Crack Isolation Membrane; ANSI A118.12.
 - a. TCNA Method F125-Partial: At all existing cracks.
 3. Bonding Coat:
 - a. Latex/Polymer Modified Portland Cement Mortar; ANSI A118.4.
 - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
 4. Grout:
 - a. High Performance Cement Grout; ANSI A118.7.
- E. TCNA Method F113A: Above-ground concrete.
 1. Locations:
 - a. Locations that ARE NOT indicated to receive waterproofing membrane in this Section or on Drawings.
 - b. Locations that ARE NOT indicated to be installed with other TCNA Method.
 2. Crack Isolation Membrane; ANSI A118.12.
 - a. TCNA Method F125-Partial: At all existing cracks.
 3. Bonding Coat:
 - a. Latex/Polymer Modified Portland Cement Mortar; ANSI A118.4.
 - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
 4. Grout:
 - a. High Performance Cement Grout; ANSI A118.7.

3.9 INSTALLATION - INTERIOR FLOORS: MORTAR BED METHOD

- A. To be used at locations where concrete substrate IS DEPRESSED.
- B. TCNA Method F114.
 - 1. Cleavage Membrane, as specified in this Section.
 - 2. Mortar Bed with Welded Wire Reinforcing Fabric; as specified in the Section.
 - a. Mortar Bed Thickness: Minimum 1-1/4 inches; maximum 2 inches.
 - 3. Bonding Coat: Latex/Polymer Modified Portland Cement Bond Coat; ANSI A118.4, as specified in this Section.
 - 4. Grout: Epoxy Grout; ANSI A118.3.

3.10 INSTALLATION - WALLS: THIN-SET METHODS

- A. TCNA Method W202E.
 - 1. Locations:
 - a. Exterior and interior locations on masonry and concrete substrates.
 - b. Waterproofing membrane required in wet areas, and for exterior applications, or if otherwise indicated on Drawings.
 - 2. Waterproofing Membrane; ANSI A118.10 (waterproofing), specified in this Section.
 - 3. Bonding Coat:
 - a. Latex/Polymer Modified Portland Cement Mortar:
 - 1) Complying with ANSI A118.4.
 - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
 - 4. Grout:
 - a. High Performance Cement Grout: ANSI A118.7.
- B. TCNA Method W244E.
 - 1. Locations:
 - a. Exterior and interior locations on metal framed walls.
 - b. Waterproofing membrane required in wet areas, and for exterior applications, or if otherwise indicated on Drawings.
 - 2. Backer Board: Cement backer board; ANSI A118.9 or ASTM C1325 (Type A).
 - 3. Waterproofing Membrane; ANSI A118.10 (waterproofing), specified in this Section.
 - 4. Bonding Coat:
 - a. Latex/Polymer Modified Portland Cement Mortar:
 - 1) Complying with ANSI A118.4.
 - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
 - 5. Grout:
 - a. High Performance Cement Grout: ANSI A118.7.

3.11 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Remove and replace unacceptable tiles. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement. Unacceptable tiles include, but are not limited to, the following:
 - 1. Tile that is damaged.
 - 2. Tile that does not match adjoining tile or is not compliant with the color/pattern indicated.
 - 3. Tile that is not fully bonded to substrate.

3.12 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean all ceramic tile surfaces so they are free of foreign matter.
- C. Remove grout residue and stains from tile as soon as possible.
- D. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions and use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.13 PROTECTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven (7) days after grouting is completed.
- D. Remove protective coverings and clean for substantial completion inspection and for final inspection. Between inspections, reinstall protective coverings and maintain protection of work.

END OF SECTION

SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Acoustic Ceiling Panels.
 - 2. Suspension Grid Systems.
 - 3. Suspended Acoustical Clouds.

- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry.
 - 2. Section 07 95 13 - Expansion Joint Cover Assemblies.
 - 3. Section 09 21 16 - Gypsum Board Assemblies.
 - 4. Division 21 - Fire Suppression: Coordinate with devices in areas of work.
 - 5. Division 23 - HVAC: Coordinate with devices in areas of work.
 - 6. Division 26 - Electrical: Coordinate with devices in areas of work.
 - 7. Division 27 - Communications: Coordinate with devices in areas of work.
 - 8. Division 28 - Electronic Safety and Security: Coordinate with devices in areas of work.

1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads And Associated Criteria For Buildings And Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

- B. ASTM International (ASTM):
 - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy- Coated (Galvannealed) by the Hot-Dip Process; 2023.
 - 2. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 - 3. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
 - 4. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
 - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 6. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2022.
 - 7. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

- B. Coordinate other construction that is concealed by or interfaces with the work of this Section. This includes, but is not limited to, wall devices, light fixtures, HVAC equipment, and fire suppression system components.

1.4 SEQUENCING

- A. Section 01 30 00 - Administrative Requirements: Scheduling and sequencing.
- B. Sequence work as to not install work until building is enclosed, sufficient air temperature and humidity level is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install ceiling panels after interior wet work is dry.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on suspension grid system components, acoustic panels, and accessories.
- C. Shop Drawings: Show suspension grid layout and dimensioning, panel layouts, lighting fixtures, air diffusers, grilles, and all other items exposed in acoustical ceilings, locations of seismic braces and hangers, and suspension, seismic and bracing details. Show details of junctions with other work or ceiling finishes, and special conditions.
- D. Provide seismic design of suspended ceiling systems under direct supervision and sealed by Professional Structural Engineer.
 - 1. Provide sealed calculations indicating that design of suspension systems provide compliance with seismic structural requirements indicated in the Performance and Design Requirements article in this Section.
- E. Samples:
 - 1. Submit two samples 12 x 12 inches in size illustrating material, fabrication, and finish of acoustic panels.
 - 2. Submit two samples each, 6 inches long, of suspension system main runner, cross runner, perimeter wall molding and trim, and seismic components.
- F. Designer's Qualification Statement.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.6 QUALIFICATIONS

- A. Designer Qualifications for Seismic Design: Perform under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Acoustical Panels and Suspension System Manufacturer Qualifications: Company specializing in manufacturing products indicated with minimum five (5) years documented experience.
- C. Installer: Company specializing in performing indicated work with minimum five (5) years documented experience.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.

- B. Maintain the following minimum environmental requirements in installation areas prior to, during, and after acoustic panel installation. If manufacturer's requirements are more stringent, comply with manufacture's requirements.
 - 1. Enclosed and weatherproof; wet work in place is completed and nominally dry; free of construction dust and debris.
 - 2. Ambient air conditions of temperature and humidity are continuously maintained at values intended for final occupancy and operations.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Furnish the following extra materials to the Owner:
 - 1. Three (3) manufacturer's cartons of each tile panel type installed.
 - 2. Twenty (20) linear feet of each of the following components of each type and color of suspended grid system installed: Main grid runners, cross grid members, perimeter wall trim, and face trim.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN REQUIREMENTS:

- A. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated according to ASCE 7 and applicable codes.
 - 1. Design is to include compliance with ASTM E580/E580M.
 - 2. Seismic Design is to comply with requirements for the Seismic Design Category as indicated on the Structural Drawings and Section 00 31 00 - Available Project Information.
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Suspension System: Secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

2.2 ACOUSTIC PANEL CEILING SYSTEMS

- A. Manufacturers:
 - 1. Armstrong World Industries.
 - 2. CertainTeed.
 - 3. USG Interiors.
 - 4. Substitutions: Section 01 60 00 - Product Requirements.

2.3 ACOUSTIC PANELS

- A. Acoustic Panels - **Type APC-1:**
 - 1. Basis of Design:
 - a. Armstrong - Calla Square Tegular (2820).
 - 2. Classification: ASTM E1264, Type IV - Mineral fiber with acoustically transparent membrane and factory-applied latex paint.
 - a. Form: 2 - water felted.
 - b. Pattern:
 - 1) E - lightly textured.
 - c. Fire Class A, ASTM E84.
 - d. Sag Resistant.

- e. Mold and Mildew Resistant.
 3. Size: 24 x 24 inches.
 4. Thickness:
 - a. 1 inch.
 5. Light Reflectance: 85 percent.
 6. NRC: 0.85.
 7. CAC: 35.
 8. Edge: Formed to suit grid profile.
 - a. Square (Calla 2820).
 9. Surface Color:
 - a. White.
 10. Suspension Grid Type as indicated in this Section:
 - a. Suspension Grid Type SG-1.
- B. Acoustic Panels - **Type APC-2:**
1. Basis of Design: Armstrong - Kitchen Zone Non-Perforated (673).
 2. Classification: ASTM E1264, Type IX - Mineral fiber composite with factory-applied latex paint finish.
 - a. Form: 2 - water felted.
 - b. Pattern:
 - 1) G - smooth.
 - c. Fire Class A, ASTM E84.
 - d. Sag Resistant.
 - e. Sag Resistant; maximum resistance for exterior application.
 - f. Mold and Mildew Resistant.
 3. Size: 24 x 24 inches.
 4. Thickness:
 - a. 5/8 inch.
 5. Light Reflectance: 89 percent.
 6. NRC: N/A.
 7. CAC: 33.
 8. Edge: Formed to suit grid profile.
 - a. Square.
 9. Surface Color: White.
 10. Suspension Grid Type as indicated in this Section:
 - a. Suspension Grid Type SG-1.
- C. Acoustic Panels - **Type APC-3:**
1. Basis of Design: Armstrong - Ceramaguard Non-Perforated (605).
 2. Classification: ASTM E1264, Type XX - Wet-formed ceramic and mineral fiber composite with factory-applied plastic paint finish.
 - a. Form: N/A.
 - b. Pattern:
 - 1) G - smooth.
 - c. Fire Class A, ASTM E84.
 - d. Sag Resistant.
 - e. Sag Resistant; maximum resistance for exterior application.
 - f. Mold and Mildew Resistant.
 3. Size: 24 x 24 inches.
 4. Thickness:
 - a. 5/8 inch.
 5. Light Reflectance: 88 percent.
 6. NRC: N/A.
 7. CAC: 40.

8. Edge: Formed to suit grid profile.
 - a. Square.
9. Surface Color: White.
10. Suspension Grid Type as indicated in this Section:
 - a. Suspension Grid Type SG-1.

2.4 SUSPENSION GRID SYSTEMS

- A. General:
 1. Support Channels and Hangers: Primed steel; size and type to suit application, seismic requirements, load support requirements, and ceiling system flatness requirements.
 2. Provide stabilizer bars, clips, splices, and perimeter wall moldings and trim required for suspension grid system, and as indicated on Drawings and in this Section.
- B. Suspension Grid - **Type SG-1**: Exposed to view.
 1. Basis of Design: Manufacturer to be same as manufacturer of ceiling panels.
 - a. Armstrong - Prelude XL.
 2. Non-fire Rated Grid: ASTM C635/C635M, exposed T; components die cut and interlocking.
 - a. Structural Classification:
 - 1) Intermediate-duty.
 3. Grid Materials: Hot-dipped galvanized steel sheet complying with ASTM A653/A653M.
 4. Exposed Grid Surface Width:
 - a. 15/16 inch.
 5. Grid Finish Color:
 - a. Match color of Acoustic Panel. If no match is available, submit full range of colors available for selection by Architect.
 6. Perimeter Wall Moldings and Trim: As indicated in ACCESSORIES article.

2.5 SUSPENDED ACOUSTICAL CLOUDS

- A. Suspended Acoustical Clouds - **Type SAC-1**:
 1. Acoustical Panels: Type APC-1 as specified in this Section.
 2. Suspension Grid: Type SG-1 as specified in this Section.
 3. Perimeter Face Trim:
 - a. Basis of Design: Axiom Vector Trim (inverted for smooth bottom edge).
 - b. Profiles and Configurations.
 - 1) Height: 6 inches.
 - 2) Bottom Edge: Aligned flush with ceiling suspension grid system.
 - a) Width to be 3/4 inch wide.
 - 3) Curved and straight trim profiles and configurations to conform to details and layouts indicated on Drawings.
 - c. Finish: Factory applied powder coat finish.
 - d. Color: Color to match grid.
 - e. Accessories:
 - 1) For straight perimeter trim corners, provide factory formed, single piece units with finished corner legs that receive and join the two perimeter trim ends.
 - 2) Provide concealed diagonal trim face bracing when trim vertical face is 8 inches or greater. This is to reinforce trim face at vertical alignment.
 - 3) Fasteners, connection, and splice plates are to be concealed from view.

2.6 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Wall Moldings: Perimeter wall moldings for termination and support of suspension grid system at abutment to vertical construction and other grid system interruptions:
 - 1. Material, Finish Type and Color: Match suspension grid system.
 - 2. For Exposed Suspension Grid System:
 - a. L-shaped molding; 7/8 inch exposed face; mounted flush with grid face.
 - 3. For Concealed Suspension Grid System:
 - a. Concealed molding.
 - 4. Manufactured Corners: Provide single piece seamless corners conforming to corner angle or radius.
 - 5. Manufactured Radius: Provide seamless radius trim at maximum lengths practical but not less than 8 feet.
 - 6. Manufactured Column Rings: For conditions where curved columns penetrate or abut ceiling, provide column trim ring at radius to match column size and radius.
- C. Perimeter Face Trim: Perimeter face trim for floating edge (exposed edge) termination of ceiling and suspension grid system. Provide the following except for elements herein that are indicated otherwise on Drawings or in this Section:
 - 1. Basis of Design: Manufacturer to be same as manufacturer of Grid System.
 - a. Armstrong: Axiom Vector Trim (inverted for smooth bottom edge).
 - 2. Profiles and Configurations.
 - a. Height:
 - 1) 6 inches.
 - b. Bottom Edge:
 - 1) Aligned flush with ceiling suspension grid system.
 - 2) Width to be 3/4 inch wide.
 - c. Curved and straight trim profiles and configurations to conform to details and layouts indicated on Drawings.
 - 3. Finish: Factory applied powder coat finish.
 - 4. Color:
 - a. For exposed suspension grid system, color to match grid.
 - b. For concealed suspension grid systems, color to be selected by Architect for full range of colors.
 - 5. Accessories:
 - a. For straight perimeter face trim corners, provide factory formed, single piece units with finished corner legs that receive and join the two perimeter trim ends.
 - b. Provide concealed diagonal trim face bracing when trim vertical face is 8 inches or greater. This is to reinforce trim face at vertical alignment.
 - c. Fasteners, connection, and splice plates are to be concealed from view.
- D. Exposed fastener heads to be shop finished to match grid system finish type and color.
- E. Touch-up Paint: Type and color to match acoustic panels and grid components.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Examination, coordination, and project conditions.
- B. Verify layout of hangers will not interfere with other work.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Suspension Grid System:
 - 1. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this Section.
 - 2. Suspended ceilings are subject to special inspection.
 - 3. Locate system on room axis according to reflected ceiling plan in Drawings.
 - 4. Install after major above ceiling work is complete. Coordinate location of hangers with other work. Coordinate with sprinkler head penetrations for oversized trim if not braced. Ceilings without rigid bracing must have 2 inch oversized trim rings for sprinklers and other penetrations.
 - 5. Install suspension system in accordance with manufacturer's seismic requirements and installation guide, and in compliance with the Seismic Design Category design requirements.
 - 6. Ceiling areas over 1,000 SF must have horizontal restraint wire or rigid bracing.
 - 7. Ceiling areas over 2,500 SF must have seismic separation joints or full height partitions.
 - 8. Install system capable of supporting imposed loads to deflection of 1/360 maximum.
 - 9. Ends of cross tees to be locked into main beams to prevent their spreading.
 - 10. Hang suspension system from building structural members and independent of walls, columns, ducts, pipes, cable trays, and conduit. Do not hang suspension system from non-structural building elements. Do not hang suspension system from roof deck. Do not allow suspension system components to touch ducts, pipes, conduit, or other ceiling installations.
 - 11. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
 - 12. Changes in ceiling plane must have positive bracing.
 - 13. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers, and related carrying channels to span extra distance.
 - 14. Do not support components on main runners or cross runners when weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
 - 15. Do not eccentrically load system or produce rotation of runners.
 - 16. Perimeter Wall Moldings:
 - a. Install perimeter wall molding at ceiling abutment to vertical construction.
 - b. Use longest practical lengths.
 - c. Install manufactured seamless corners.
 - d. Install manufactured seamless radius trim at curved walls and round columns.
 - e. Overlap and rivet corners.
 - 17. Perimeter Face Trim:
 - a. Install perimeter face trim at floating edge (exposed edge) termination of ceiling and suspension grid system if such conditions are indicated on Drawings.
 - b. Use longest practical lengths.

- c. For straight perimeter face trim corners, provide factory formed, single piece units with finished corner legs that receive and join the two perimeter trim ends.
 - d. Provide concealed diagonal trim face bracing when trim vertical face is 8 inches or greater. This is to reinforce trim face at vertical alignment.
18. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.
- C. Acoustic Panels:
1. Fit acoustic panels in place, free from damaged edges or other defects detrimental to appearance and function.
 2. Lay directional patterned panels as shown on the Drawings. Fit border trim neatly against abutting surfaces.
 3. Install panels after above ceiling work is complete.
 4. Install acoustic panels level, in uniform plane, and free from twist, warp, and dents.
 5. Cutting Acoustic Panels:
 - a. Cut to fit irregular grid and perimeter edge trim.
 - b. Make field cut edges of same profile as factory edges.
 - c. Double cut and field finish exposed edges to match panel finish.
 6. Where round obstructions and bullnose concrete block corners occur, provide preformed closures to match perimeter wall molding or trim.
 7. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.
 8. Install hold-down clips to retain panels tight to suspension grid system within 10 feet of exterior door.
 9. Install acoustical insulation as indicated on Drawings.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- C. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect against modifications to completed suspension and hanger systems by unauthorized persons.
- C. Protect installed work from damage and marring of finishes. Remove and replace components that become damaged.

3.7 SCHEDULES

- A. Refer to Reflected Ceiling Plans, Finish Schedules, Details, and Notes on Drawings for locations and configurations of systems indicated in this Section.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Resilient tile flooring.
 - 2. Resilient wall base - non-vented type.
 - 3. Resilient stair covering.
- B. Related Requirements:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Finishing of floor slab for resilient floor application.
 - 2. Sections indicating Plumbing, Electrical and Mechanical as related to floor installed devices such as drains, utility boxes, devices, and trim.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness; 2015, Reapproval 2021.
 - 2. ASTM D3389 - Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform Abrader); 2021.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 4. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
 - 5. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2021a, Editorial Revisions.
 - 6. ASTM F150 - Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring; 2006, Reapproval 2018.
 - 7. ASTM F386 - Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces; 2017, Reapproval 2022.
 - 8. ASTM F410 - Standard Test Method for Wear Layer Thickness of Resilient Floor Coverings by Optical Measurement; 2008, Reapproval 2022.
 - 9. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
 - 10. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2023.
 - 11. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021a.
 - 12. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.
 - 13. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
 - 14. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
 - 15. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing; 2019.
 - 16. ASTM F1914 - Standard Test Methods for Short-Term Indentation and Residual Indentation of Resilient Floor Covering; 2018, Reapproval 2023.
 - 17. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
 - 18. ASTM F2195 - Standard Specification for Linoleum Floor Tile; 2018, Reapproval 2023.

19. ASTM F2421 - Standard Test Method for Measurement of Resilient Floor Plank by Dial Gauge; 2019a.
- B. National Fire Protection Association (NFPA):
 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing physical and performance characteristics; include manufacturer's full range of sizes, patterns, colors, and finishes available; include moldings, transition and edge trim as indicated on Drawings and otherwise recommended by manufacturer of Resilient Floor products; include installation instructions.
- C. Shop Drawings: Submit shop drawings indicating each product, locations, layouts, dimensions, patterns, trim details, and interface with adjacent work by others.
- D. Samples for Initial Selection: Two manufacturer's complete set of color samples illustrating the full range of sizes, patterns, colors, and finishes available; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection; samples to be same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 MOCK-UPS

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. At project site, install mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Architect's approval of mock-up.
 1. Mock-up Size and Locations: One typical room; location as indicated by Architect.
 2. Mock-up may be incorporated into the final construction upon Architect's approval for mock-up to remain.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

- C. Store all materials off the floor in an acclimatized, weather-tight space.
- D. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- E. Protect roll materials from damage by storing on end.
- F. Do not double stack pallets.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work.
- B. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Vinyl Composition Tile: Provide five (5) year manufacturer's warranty.
- C. Luxury Vinyl Tile:
 - 1. Flooring Tiles of Class III, Type B - Embossed Surface with minimum of 0.020 inch (20 mil) Wear Layer: Provide fifteen (15) year manufacturer's warranty.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Resilient Flooring: Furnish to Owner the following for each type and color installed.
 - 1. Fifty (50) square feet of flooring.
- C. Resilient Wall Base: Furnish to Owner the following for each type and color installed.
 - 1. One hundred (100) linear feet of wall base.
 - 2. Ten (10) each of pre-molded corners matching color and profile of each wall base.
- D. Resilient Stair Covering: Furnish to Owner the following for each type and color installed.
 - 1. Five (5) percent of components and materials.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire Performance Characteristics: Unless otherwise indicated, provide resilient flooring products with the following fire performance characteristics in accordance with the standards. Testing to be by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:
 - 1. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1) in accordance with ASTM E648 or NFPA 253.
 - 3. Smoke Density: 450 or less in accordance with ASTM E662.

2.2 RESILIENT TILE FLOORING

- A. Vinyl Composition Tile (VCT):
 - 1. Manufacturers:
 - a. Armstrong Flooring.

- b. Johnsonite, a Tarkett Company.
 - c. Mannington Commercial.
 - d. Tarkett Company.
 - e. Substitutions: Section 01 60 00 - Product Requirements.
 2. Basis of Design:
 - a. As indicated on Drawings.
 3. Minimum Requirements: Comply with ASTM F1066, of Class specified.
 - a. Class 2 - Through pattern tile.
 4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1) in accordance with ASTM E648 or NFPA 253.
 5. Smoke Density: 450 or less in accordance with ASTM E662.
 6. Tile Size:
 - a. 12 x 12 inches.
 7. Total Thickness: 0.125 inch.
 8. Colors and Patterns:
 - a. To be selected by Architect from manufacturer's full range.
- B. Luxury Vinyl Tile (LVT):
1. Manufacturers:
 - a. Armstrong Flooring.
 - b. Flexco Corporation.
 - c. Interface, Inc.
 - d. Tarkett Company.
 - e. Mannington Commercial.
 - f. Metroflor Corporation.
 - g. Mohawk Group.
 - h. Patcraft.
 - i. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Basis of Design:
 - a. As indicated on Drawings.
 3. Minimum Requirements: Comply with ASTM F1700.
 - a. Class and Type:
 - 1) Class III - Printed Film; Type B - Embossed Surface.
 4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1) in accordance with ASTM E648 or NFPA 253.
 5. Smoke Density: 450 or less in accordance with ASTM E662.
 6. Tile Size:
 - a. To be selected by Architect from manufacturer's full range.
 7. Factory Finish Layer: Commercial UV-cured polyurethane coating.
 8. Wear Layer Thickness: Minimum when tested in accordance with ASTM F410.
 - a. 0.022 inch (0.55 mm) (22 mil).
 9. Total Thickness: Minimum when tested in accordance with ASTM F386.
 - a. 0.180 inch (4.57 mm) (180 mil).
 10. Squareness: 0.010 inch maximum in accordance with ASTM F2421.
 11. Residual Indentation: No greater than 8 percent when tested per ASTM F1914.
 12. Colors, Patterns, and Surface Textures:
 - a. To be selected by Architect from manufacturer's full range.

2.3 RESILIENT WALL BASE - NON-VENTED TYPE

- A. Manufacturers:
1. Mannington Commercial.
 2. Johnsonite, a Tarkett Company.
 3. Roppe Corporation.

4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
 1. As indicated on Drawings.
- C. Resilient Non-vented Wall Base:
 1. Comply with ASTM F1861.
 - a. Type:
 - 1) Type TS - Rubber, vulcanized thermoset.
 - b. Group:
 - 1) Group 1 - Solid.
 - c. Style:
 - 1) Style B - Top set, Cove.
 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1), when tested in accordance with ASTM E648 or NFPA 253.
 3. Smoke Density: 450 or less in accordance with ASTM E662.
 4. Height:
 - a. 4 inches.
 5. Thickness: 0.125 inch thick.
 6. Finish: Satin.
 7. Length: Roll.
 8. Accessories: Premolded external corners and end stops.
 9. Colors: Solid.
 - a. To be selected by Architect from manufacturer's full range.

2.4 RESILIENT STAIR COVERING

- A. Manufacturers:
 1. Flexco Corporation.
 2. Interface, Inc.
 3. Johnsonite, a Tarkett Company.
 4. Mannington Commercial.
 5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
 1. As indicated on Drawings.
- C. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1) in accordance with ASTM E648 or NFPA 253.
- D. Smoke Density: 450 or less in accordance with ASTM E662.
- E. Material:
 1. Rubber.
- F. Covering Style:
 1. Nosing/Tread/Riser Style: Single piece covering full width and depth of stair nosing, tread, and riser in one piece; nosing not less than 1-3/4 inches deep.
 - a. Bottom edge of nosing is to abut and join to top edge of riser covering material below without gap or void and in a manner as to prevent protruding trip hazard at bottom of nosing edge.
- G. Nosing:
 1. Thickness: Minimum 0.210 inch.
 2. Angle and profile to match profile of riser below for full adhesion without gaps that could cause trip hazard.
 3. Integral non-slip abrasive nose strip; contrasting color complying with visually impaired requirements.

- a. Width to be 2 inches.
- 4. Integral photoluminescent (glow-in-the-dark) nose strip; 2 inches wide (1 inch along nose vertical face and 1 inch along nose top); contrasting color complying with visually impaired requirements.
- H. Tread Design Pattern:
 - 1. Round discs; raised.
- I. Stair Landings Flooring: Same manufacturer, material, color, and pattern as the Stair Covering.
- J. Colors: Integral throughout product.
 - 1. To be selected by Architect from manufacturer's full range.

2.5 ACCESSORIES

- A. Subfloor Filler: Factory mixed latex type recommended by manufacturers of flooring and adhesive materials and compatible with substrate materials and conditions.
- B. Primers and Adhesives: Waterproof type recommended by manufacturer of flooring material and compatible with substrate materials and conditions.
- C. Moldings, Transition and Edge Strips: As indicated on Drawings or as otherwise selected by Architect from Product Data submittals.
- D. Feature Strips: Of same material as tile. Width as indicated on Drawings.
- E. Cleaner, Sealer and Wax/Polish: Provide finishing products, equipment, and application as recommended by flooring material manufacturer.
 - 1. Cleaner: As required for cleaning.
 - 2. Sealer: 2 coats minimum.
 - 3. Wax/Polish: 4 coats minimum.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify compliance with the requirements in the PART 1, ENVIRONMENTAL REQUIREMENTS article.
- C. Verify that existing conditions are as required before starting work of the Section.
- D. Verify that the assembled and finished floor system of this Section will finish flush with floor boxes, inserts, devices, and adjacent finished floors. This flush transition requirement cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- E. Verify that floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
- F. Verify that overhead work trades have finished their work in the flooring areas.
- G. Verify that the building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.
- H. Verify that surfaces are 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.

- I. Verify that the concrete finish has been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
 - 1. Sloped Concrete: Levelness is relative to slopes indicated such as slopes to drains.
- J. 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 wall base material.
- K. Verify that the concrete substrate is dry in accordance with industry standard testing procedures, free of foreign materials, and broom cleaned.
- L. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
 - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
 - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture Vapor Emission Rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
 - 4. Conduct tests by an independent testing agency acceptable to Owner.
- M. Do not proceed with installation work until noncompliant conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Prepare substrates to receive work as recommended by work product manufacturers.
- D. 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.
- E. Prohibit traffic until filler is cured.
- F. Clean substrate.
- G. Apply primer as recommended by resilient flooring product manufacturer and where required to prevent "bleed-through" or interference with adhesion.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. General:
 - 1. Starting installation constitutes acceptance of sub-floor conditions.
 - 2. Install in accordance with manufacturer's written instructions and recommendations to ensure warranty requirements.
 - 3. Spread only enough adhesive to permit installation of materials before initial set.
 - 4. Fit joints and butt seams tightly.

5. Set flooring in place, press with heavy roller to attain full adhesion. Sound top surface of installed flooring material to ensure there are no hollow sounds (hollow sound may indicate flooring that is not fully adhered/bonded to substrate).
 6. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door (door in closed position).
 7. Install edge transition strips at unprotected or exposed edges, where flooring terminates, where flooring transitions to dissimilar flooring finishes and as indicated on Drawings.
 8. Resilient Strips: Attach to substrate using adhesive.
 9. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
 10. Install flooring in recessed floor access covers, maintaining floor pattern.
 11. At movable partitions, install flooring under partitions without interrupting floor pattern.
 12. If feature strips/designs are indicated on Drawings, install feature strips/designs.
 13. Non-Factory Finished Flooring: Provide flooring finishes as indicated and in accordance with flooring manufacturer's recommendations.
- C. Resilient Tile Flooring:
1. Mix tile from containers to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
 2. Unless flooring layout design is indicated otherwise on Drawings, lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
 3. Install tile to pattern indicated on Drawings. Allow minimum 1/2 full size tile width at room or area perimeter.
- D. Resilient Wall Base:
1. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
 2. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
 3. Install wall base on solid backing. Bond tightly to wall and floor surfaces. Bottom edge of wall base should be consistently in contact with finished flooring.
 4. Scribe and fit to door frames and other interruptions.
- E. Resilient Stair Coverings:
1. Install stair coverings in one piece for full width of stairs.
 2. Install stringers configured tightly to stair profile.
 3. Adhere over entire surface. Fit accurately and securely.
 4. Nosing angle and profile is to match the profile of the riser below. Install nosing with full adhesion ensuring that bottom edge of the nosing is without gaps and does not create a protruding tripping hazard.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess adhesive from installed work and adjacent surfaces without damage to surfaces.
- C. Clean and maintain the work.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.

- B. Prohibit traffic on flooring for duration recommended by manufacturer and not less than the following:
 - 1. Light Foot Traffic: 24 hours after installation.
 - 2. Rolling Load Traffic: 72 hours after installation.
- C. Protect the work from stains and damage.

END OF SECTION

SECTION 09 65 66
RESILIENT ATHLETIC FLOORING

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Flooring Type:
 - a. Vinyl sheet flooring, fully adhered.
 - 2. Game lines and graphics.
 - 3. Wall base.
- B. Related Requirements:
 - 1. Section 03 30 00 - Cast-in-Place Concrete: Coordinate compatibility of concrete curing compounds with finish flooring application requirements.
 - 2. Section 09 65 00 - Resilient Flooring: Wall base finish.
 - 3. Division 12 - Furnishings: Loads imposed on flooring by furnishings.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.
 - 2. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
 - 3. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004, Reapproval 2021.
 - 4. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
 - 5. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Cast-in-Place Concrete: Coordinate compatibility of concrete curing compounds with finish flooring application requirements.
- C. Telescoping Bleachers: Coordinate installation of flooring with loads imposed by telescoping bleachers (if any) to provide adequate support for bleacher rollers and to not exceed resilient athletic flooring load rating (psi).

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings:
 - 1. Fabrication and installation details.
 - 2. Layout, colors, and widths of game lines and graphics.

3. Equipment locations including floor inserts for athletic equipment installed through flooring.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes and colors available; submit for Architect's initial selections.
 1. Include color charts for game line and graphics paints.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 12 x 12 inches mounted on solid backing. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
 1. Include samples of game lines, illustrating colors selected.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer certified in writing by the flooring manufacturer to be qualified for installation of specified flooring system.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- C. Store all materials off the floor in an acclimatized, weather-tight space.
- D. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- E. Protect roll materials from damage by storing on end.
- F. Do not double stack pallets.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work.
- B. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide ten (10) year manufacturer's warranty in which manufacturer agrees to repair or replace sports flooring, including labor, that fails within specified warranty period.
- C. Provide two (2) year installer's warranty in which installer agrees to repair or replace sports flooring that fails due to poor workmanship or faulty installation within the specified warranty period.

1.9 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- a. Sheet Flooring: Furnish full-width rolls of not less than 10 linear feet for each 500 linear feet or fraction thereof, of each type, color, and pattern of flooring installed.

PART 2 PRODUCTS

2.1 PREFORMED ATHLETIC FLOORING

- A. Vinyl Sheet Flooring:
 1. Wearing Surface: Pure polyvinyl chloride, mechanically extruded and uniformly resilient material with uniform color throughout thickness. Comply with ASTM F1303.
 2. Backing: PVC foam. Comply with ASTM F1303.
 3. Sheet Total Thickness:
 - a. Minimum 0.26 inch (6.6 mm).
 4. Sheet Wear Layer Thickness: Minimum 0.040 inch (1.0 mm).
 5. Sheet Width: Minimum 59 inches (1500 mm).
 6. Sheet Lengths: Minimum 49 feet (15 m).
 7. Ball Rebound: Minimum 96 percent.
 8. Seaming Method: Welding with heat or chemical.
 9. Surface Texture: Embossed.
 10. Colors and Patterns:
 - a. As selected by Architect from manufacturer's full range.
 11. Game Lines and Graphics: High gloss coating as approved by sheet flooring manufacturer.
 - a. Game Lines:
 - 1) Refer to Drawings for required game line types and layouts (e.g. basketball, volleyball, etc.).
 - 2) Layout shall be as indicated on Drawings and in compliance with the current NFHS - Court and Field Diagram Guide.
 12. Top Coat: If recommended by sheet flooring manufacturer to protect game lines, graphics and wearing surface, apply clear top coat material as recommended by flooring manufacturer.
 13. Manufacturers: All products by the same manufacturer.
 - a. Gerflor.
 - b. Shaw Contract.
 - c. Tarkett Sports.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Wall Base:
 1. Provide as indicated in Section 09 65 00 - Resilient Flooring and on Drawings.
 2. Colors:
 - a. As selected by Architect from manufacturer's full range as submitted under Section 09 65 00.

2.2 ACCESSORIES

- A. Leveling Compound: Type recommended by flooring manufacturer for substrate conditions and bond for flooring adhesive.
- B. Flooring Adhesive: Waterproof type recommended by flooring manufacturer for the flooring material and substrate conditions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify compliance with the requirements in the PART 1, ENVIRONMENTAL REQUIREMENTS article.
- C. Verify that existing conditions are as required before starting work of the Section.
- D. Verify that the assembled and finished floor system of this Section will finish flush with floor boxes, inserts, devices, and adjacent finished floors. This flush transition requirement cannot be over emphasized. The transition joints must be tight and flush to eliminate trip hazards.
- E. Verify that floor boxes, inserts, utilities, and other floor devices are installed in correct locations.
- F. Verify that overhead work trades have finished their work in the flooring areas.
- G. Verify that the building is dry, all openings are closed in, adequate ventilation is provided, and permanent heating and air conditioning is installed operating and providing the required conditioning of the air in the work area.
- H. Verify that surfaces are 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.
- I. Verify that the concrete finish has been steel troweled to a true level and finished smooth and straight to a tolerance of 1/4 inch in a 10 foot radius. High spots are to be ground level and low spots filled in with approved leveling compounds to achieve the required elevation and level flatness.
 - 1. Sloped Concrete: Levelness is relative to slopes indicated such as slopes to drains.
- J. 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 wall base material.
- K. Verify that the concrete substrate is dry in accordance with industry standard testing procedures, free of foreign materials, and broom cleaned.
- L. Cementitious Substrate Surfaces Testing: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Alkalinity (pH) Testing: ASTM F710. Measurement for pH range is to be not less than 7 pH and not more than 9 pH, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
 - 2. Internal Relative Humidity Testing: ASTM F2170. Perform test using in situ probes. Humidity level of substrates is to measure no more than 75 percent relative humidity level, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
 - 3. Moisture Vapor Emission Testing: ASTM F1869. Perform anhydrous calcium chloride test. Moisture vapor emission rate (MVER) from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hours, unless written recommendations of flooring manufacturer or adhesive manufacturer are more stringent.
 - 4. Conduct tests by an independent testing agency acceptable to Owner.
- M. Do not proceed with installation work until noncompliant conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Prepare substrates to receive work as recommended by work product manufacturers.
- D. 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.
- E. Prohibit traffic until filler is cured.
- F. Clean substrate.
- G. Apply primer as recommended by resilient flooring product manufacturer and where required to prevent "bleed-through" or interference with adhesion.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Starting installation constitutes acceptance of sub-floor conditions.
- C. Vinyl Sheet Flooring:
 - 1. Comply with manufacturer's installation instructions and recommendations and approved shop drawings.
 - 2. Unroll flooring and allow to relax before beginning installation.
 - 3. Mix adhesive thoroughly and apply to substrate with notched trowel. Roll flooring into fresh adhesive, overlapping end seams and double cutting, butting factory edges and compression fitting.
 - 4. Roll entire flooring surface with steel roller to assure adhesion to substrate and eliminate air bubbles.
 - 5. Immediately remove any adhesive from flooring surface, using chemical recommended by flooring manufacturer.
 - 6. Weld seams using techniques and equipment recommended by manufacturer.
 - 7. Lay out game lines using tape and taping machine approved by flooring manufacturer. Apply game line paint with roller and allow to dry before removing tape.
 - 8. Apply transparent top coat over flooring if recommended by manufacturer for protection and to achieve a uniform finished appearance.
- D. Games Lines and Graphics: Refer to PART 2 PRODUCTS in this Section for sheet flooring material description and subparagraphs therein.
- E. Install wall base.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean flooring using methods recommended by manufacturer.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect finished flooring from construction traffic and maintain without damage.

END OF SECTION

SECTION 09 84 00
ACOUSTIC ROOM COMPONENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall mounted acoustical panels.
 - 2. Ceiling mounted acoustical panels.
- B. Related Requirements:
 - 1. Section 09 51 13 - Acoustical Panel Ceilings: General purpose acoustical ceiling panels and grids serving as supports for ceiling mounted acoustical panels specified in this Section.
 - 2. Section 09 77 23 - Fabric Wrapped Panels: General purpose sound absorptive panels.
 - 3. Section 09 90 00 - Painting and Coating: Field painting of acoustical diffuser panels.

1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
 - 1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.
 - 2. ASTM C612 - Specification for Mineral Fiber Block and Board Thermal Insulation; 2014, Reapproval 2019.
 - 3. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
 - 4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 5. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
 - 6. ASTM E336 - Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings; 2023.
 - 7. ASTM E413 - Classification for Rating Sound Insulation; 2022.
 - 8. ASTM E795 - Practices for Mounting Test Specimens During Sound Absorption Tests; 2023.
 - 9. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.
- C. Underwriters Laboratories, Inc. (UL):
 - 1. UL 723 - UL Standard for Safety Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate requirements for blocking and support with substrate construction to receive the Work of this Section.
- C. Coordinate requirements for ceiling mounted acoustical panels with substrate and framing members of ceiling type to which acoustical panels are to be installed. Coordinate to ensure proper fit and mounting of panels without gaps or uneven alignment.

- D. Coordinate work with locations of electrical, fire, and safety devices to avoid conflicts.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data: Manufacturer's data sheets, installation instructions, and maintenance recommendations for each type of acoustical panel.
 - 1. Include data indicating coefficients of absorption and Sabines per unit for each type of panel used in the analysis and proposed design layout.
- C. Shop Drawings: Prepared by manufacturer. Include elevations showing acoustic room components sizes, arrangements, and details of each condition of installation. Show fabrication and installation details.
- D. Samples for Initial Selection: Two manufacturer's complete set of color charts illustrating the full range of finishes and colors available; include 12 x 12 inches typical panel with mounting hardware; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each finish and color; each sample to be 12 x 12 inches illustrating actual panel construction with mounting hardware. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Product Test Reports: Indicating compliance of products with requirements, from a qualified independent testing agency.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Comply with recommendations of the manufacturers of the products to be used for the Work of this Section.
- C. Deliver, store, and handle acoustic panels in accordance with product manufacturer's recommendations. Ship to jobsite only after roughing-in, painting work, and other related finish work has been completed, installation areas are ready to accept units, and manufacturers' recommended temperature and humidity levels will be maintained during the remainder of construction.

1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Submit Manufacturer's written warranty for repair or replacement of acoustical panels that fail in materials or workmanship within five (5) years from date of Substantial Completion. Failures are defined to include, but are not limited to, the following:
 - 1. Fracturing or breaking of unit components which results from normal wear and tear and normal use other than vandalism.
 - 2. Delamination or other failures of glue bond of components.
 - 3. Warping of components not resulting from leaks, flooding, or other uncontrolled moisture or humidity.

4. Failure of unit to perform acoustically in accordance with manufacturer's published data.
- C. Special Warranty:
1. Cementitious Wood Fiber Panels Warranty: Submit manufacturer executed written warranty agreeing to repair or replace panels that fail within the warranty period.
 - a. Failures include, but are not limited to the following:
 - 1) Defects in materials or factory workmanship.
 - b. Warranty Period: Thirty (30) years from date of substantial completion.
 - c. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. Furnish the following to Owner for each panel size, color, and pattern installed. Include full set of mounting hardware for each panel furnished. Hardware to be same as was used for installed panels.
 1. Panels equal to five percent (5%), but not less than one (1) each.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire Performance Characteristics:
 1. Comply with ASTM E84 or UL 723, unless otherwise indicated.
 - a. Flame Spread Index: 25 or less.
 - b. Smoke Developed Index: 450 or less.
 2. Identify products with appropriate UL labeling.
- B. Seismic Performance:
 1. Comply with ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads" based upon seismic design criteria indicated.
- C. Provide a system of sound absorbing and sound diffusing panels to reduce excess sound energy levels and improve sound distribution throughout the space:
 1. System components, configurations, and locations to be as indicated on Drawings.

2.2 MANUFACTURERS

- A. Manufacturers:
 1. AVL Systems, Inc.
 2. Carnegie Fabrics, LLC.
 3. Decoustics.
 4. Novawall Systems Inc.
 5. RPG Acoustical Systems.
 6. Sound Seal.
 7. Wenger Corporation.
 8. Cementitious Wood Fiber Panels:
 - a. Acoustic Sonic, Inc.
 - b. ASI Architectural.
 - c. Tectum by Armstrong World Industries, Inc.

9. Substitutions: Section 01 60 00 - Product Requirements.

2.3 MATERIALS

- A. Glass Fiber Board: ASTM C612, Type 1A, 6 lbs/cu. ft. (96 kg/cu. m) density molded rigid board, flame spread index 25 maximum, and smoke-developed index 450 maximum.
- B. Thermoplastic Sheet: PVC acrylic plastic sheet, flame spread index 25 maximum, and smoke-developed index 450 maximum.
- C. Fabric Covering Material: Fabric wrapped, coverings, and finishes to be 100 percent woven plain weave polyester 2-ply, with the following characteristics:
1. Light Fastness: AATCC 16, Option 3: 40 hours.
 2. Fastness to Crocking: AATCC 8: #4 Wet & Dry.
 3. Flammability: ASTM E84, Class A or 1.

2.4 ACOUSTICAL PANELS

- A. Wall and Ceiling Absorber Panels: Fabric covering finish laminated to rigid glass-fiber board. Glass-fiber board to have chemically hardened edges.
1. Basis of Design:
 - a. AVL Systems Inc. - Acoustech Panels.
 2. Panel Size:
 - a. Shape, thickness, width, and length indicated on Drawings.
 3. Fabrics and Colors:
 - a. As selected by Architect from manufacturer's full range.
 4. Wall Panel Mounting Method: Metal wall bracket with panel-mounted Z-bracket.
 5. Ceiling Panel Mounting Method: Lay-in ceiling grid clip.
 6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 48 inch (1220 by 1220 mm) unit:

Panel Thickness / Mount Type	Sound Absorption Coefficient at Hz Indicated (Tested ASTM C423)						
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	NRC
3/4 Inch Thick / Mount A	0.08	0.26	0.71	0.98	1.01	1.03	0.75
1 Inch Thick / Mount A	0.07	0.45	0.95	1.07	1.07	1.18	0.90
1-1/2 inches Thick / Mount A	0.29	0.73	1.13	1.16	1.10	1.18	1.05
2 Inches Thick / Mount A	0.38	1.96	1.16	1.16	1.11	1.28	1.10
3 Inches Thick / Mount A	0.49	1.12	1.23	1.07	1.01	1.05	1.10
4 Inches Thick / Mount A	0.67	1.16	1.37	1.21	1.19	1.22	1.15

- B. Wall and Ceiling Absorber Panels: Fabric covering finish laminated to rigid glass-fiber board. Glass-fiber board to have chemically hardened edges.
1. Basis of Design: Wenger - Wall Absorber Panel and Ceiling Absorber Panel.
 2. Panel Size:
 - a. 3 inches (80 mm) thick; width and length indicated on Drawings.
 3. Fabrics and Colors:
 - a. As selected by Architect from manufacturer's full range.
 4. Wall Panel Mounting Method: Metal wall bracket with panel-mounted Z-bracket.
 5. Ceiling Panel Mounting Method: Lay-in ceiling grid clip.

6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 48 inch (1220 by 1220 mm) unit:

Panel Thickness / Mount Type	Sound Absorption Coefficient at Hz Indicated					
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
2 Inches Thick / Mount F6	0.50	0.96	1.27	1.27	1.23	1.18
3 Inches Thick / Mount F6	0.65	1.10	1.31	1.23	1.20	1.09
4 Inches Thick / Mount F6	0.84	1.17	1.34	1.32	1.25	1.20

- C. Wall Diffuser Panels: Fabric wrap laminated to acoustically configured molded thermoplastic panel 0.125 inch (3 mm) thick.

1. Basis of Design:
 - a. Wenger - Convex Wall Diffuser Panel, Type I (without sound attenuation board adhered to internal surface of panel).
 - b. Wenger - Pyramidal Wall Diffuser Panel, Type I (without sound attenuation board adhered to internal surface of panel).
2. Panel Size: Width and length indicated on Drawings.
3. Fabrics and Colors:
 - a. As selected by Architect from manufacturer's full range.
4. Wall Panel Mounting Method: Metal wall bracket with panel-mounted Z-bracket.
5. Sound Transmission Class (STC): 23, in accordance with ASTM E90 and ASTM E413.
6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 48 inch (1220 by 1220 mm) unit:

Panel Shape / Mount Type	Sound Absorption Coefficient at Hz Indicated					
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
Convex / Mount A	0.18	0.18	0.13	0.1	0.12	0.16
Convex / Mount F7	0.25	0.14	0.11	0.1	0.13	0.16
Pyramidal / Mount A	0.23	0.18	0.13	0.12	0.14	0.11
Pyramidal / Mount F7	0.22	0.18	0.12	0.12	0.17	0.20

- D. Wall Diffuser/Absorber Panels: Fabric wrap laminated to acoustically configured selectively sound-absorptive polycylindrical convex molded thermoplastic panel 0.125 inch (3 mm) thick, and with sound attenuation board adhered to internal surface of panel.

1. Basis of Design: Wenger - Convex Wall Diffuser/Absorber Panel, Type II (with sound attenuation board adhered to internal surface of panel).
2. Panel Size: Width and length indicated on Drawings.
3. Fabrics and Colors:
 - a. As selected by Architect from manufacturer's full range.
4. Wall Panel Mounting Method: Metal wall bracket with panel-mounted grooved button.
5. Sound Transmission Class (STC): 23, in accordance with ASTM E90 and ASTM E413.
6. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 96 inch (1220 by 2440 mm) unit:

Mount Type	Sound Absorption Coefficient at Hz Indicated					
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
Mount A	0.34	0.27	0.14	0.11	0.11	0.19
Mount F7	0.28	0.29	0.19	0.13	0.13	0.20

- E. Ceiling Diffuser Panels: Acoustically configured polycylindrical convex molded thermoplastic panel 0.125 inch (3 mm) thick.
1. Basis of Design: Wenger - Convex Ceiling Diffuser Panel Type I (without sound attenuation board adhered to internal surface of panel).
 2. Panel Size: Width and length indicated on Drawings.
 3. Finish: Manufacturer's standard textured white.
 4. Ceiling Panel Mounting Method: Lay-in ceiling grid clip.
 5. Acoustical Performance, One-third Octave Band Center Frequency, Hz, for 48 by 96 inch (1220 by 2440 mm) unit:

Mount Type	Sound Absorption Coefficient at Hz Indicated					
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
Mount A	0.49	0.16	0.10	0.04	0.03	0.05
Mount E400	0.21	0.16	0.16	0.15	0.14	0.26

- F. Cementitious Wood Fiber Panels: Provide panels fabricated of excelsior wood fibers bonded with water resistant inorganic hydraulic cement.
1. Basis of Design:
 - a. As indicated on Drawings.
 2. Dimensional Stability/Mold Resistance: No significant mold growth when tested in accordance with ASTM D3273.
 3. Surface Burn Characteristics: Acoustical assemblies to be designed and tested to provide the following surface burning characteristics in accordance with the following:
 - a. ASTM E84:
 - 1) Flame Spread: 0.
 - 2) Smoke Developed: 0.
 - b. Ceiling Panels: UL Classified Flame Spread.
 - 1) ASTM E1264; Class A.
 4. Provide UL labeling indicating panel Surface Burning Characteristics.
 5. Provide UL Classified Acoustical Material labeling indicating panel Noise Reduction Coefficient (NRC).
 6. Noise Reduction Coefficient (NRC) and Mounting Type: Acoustical panel systems to be manufactured, fabricated, and installed to provide Noise Reduction Coefficient (NRC) rating and Mounting type in accordance with ASTM E795 when tested in accordance with ASTM C423:
 - a. As indicated in the following table:

Panel Thickness	Noise Reduction Coefficient				
	Mount A	Mount D20	Mount C20	Mount C40	Mount E400
1 inch	NRC 0.40	NRC 0.45	NRC 0.80	NRC 0.85	NRC 0.85
1-3/8 inch	NRC 0.55	NRC 0.60	NRC 0.85	NRC 0.90	NRC 0.90
1-5/8 inch composite**	NRC 0.85	N/A	N/A	N/A	N/A
2 inch	NRC 0.60	NRC 0.70	NRC 0.90	NRC 0.95	NRC 0.95

**The 1-5/8 inch thickness is a unique composite panel design that creates single panels for Mount Type A application:

Face Panel: 5/8 inch thick wood fiber panel.

Attached Backing: 1 inch thick acoustic absorption material with continuous perimeter closure of 1 inch thick by 2 inch wide wood fiber strip (finished to match Face Panel).

This composite panel design simulates a 1 inch panel thickness, Mount C40, total 2-5/8 inch thickness; or a 1-3/8 inch panel thickness, Mount C20, total 2-3/16 inch

thickness.

7. Panel applications include the following surface types:
 - a. Panels for Wall Surfaces.
 - b. Panels for Ceiling Surfaces.
8. Panels:
 - a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.
 - b. Panel Thickness:
 - 1) As indicated on Drawings.
 - c. Panel Edge Profiles:
 - 1) Beveled.
 - d. Panel Sizes:
 - 1) As indicated on Drawings.
 - e. Panel Surface Texture: Coarse.
 - f. Paint:
 - 1) Factory Applied.
 - a) Color:
 - (1) As selected by Architect from full range of manufacturer's options.
 - 2) Field Applied.
 - a) Paint manufacturer, type, and application method to match that used for factory applied coatings.
 - b) 3 coats to be painted over factory applied coats.
 - c) Color:
 - (1) Multiple colors as indicated on Drawings. Selection of colors to be by Architect.
 - g. Surface finished appearance to be uniform from panel to panel.
 - h. Mounting Types:
 - 1) As indicated on Drawings.
9. Supports, Fasteners, and Anchors: To be corrosion resistant and as approved by manufacturer.
10. Touch-Up Paint: Paint manufacturer, type, color, application, and appearance to match finish indicated.
 - a. Apply to field cut conditions.
 - b. Apply to exposed fasteners. Use paint products compatible with fastener material and finish for adhesion.

2.5 ACCESSORIES

- A. Provide accessories as required to complete Work in accordance with the Drawings and as recommended by the manufacturer for application conditions.
- B. Mounting Devices and Anchors:
 1. As required to complete Work in accordance with the Drawings and as recommended by manufacturer.
 2. Designed and installed to anchor and withstand loads imposed by installed components.
 3. Wall Brackets: Galvanized steel rail configured to accept grooved epoxy buttons or Z-brackets attached to panel corners on concealed side.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine acoustical panels installation substrates, supports and surroundings for compliance with requirements for installation securement, tolerances, required overhead clearances, and other existing conditions affecting installation and performance of acoustical panels. Proceed with unit installation upon correction of unsatisfactory conditions.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install units plumb, level, and true.
- C. Install units in accordance with the Drawings, manufacturer's recommendations, and as indicated regarding brackets, supports, anchors, and fasteners.
- D. Install wall-mounted acoustical panels utilizing corner mounting Z-brackets or grooved buttons and concealed wall brackets. Where indicated, secure units to wall with fasteners along top of unit.
- E. Install ceiling-mounted acoustical panels utilizing integral corner mounting brackets and mounting methods applicable to the design requirements.
 - 1. Ceiling Grid Mounted: Mount and fasten panels to grid using grid clips.
 - 2. Direct Mounted: Attach directly to substrate using back-mounted clip and exposed fastener.
 - 3. Suspended: Hang panels plumb and free from structural members. Use carrying channels where structural members cannot be used. Use post-installed anchors in concrete slabs.
- F. Install seismic bracing and fastening in accordance with applicable code requirements and as indicated in this Section.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Should completed installation fail to meet requirements, Contractor shall make modifications necessary to correct performance and retest room as directed by Architect to indicate compliance, at Contractor's expense.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Repair or replace defective Work in a manner acceptable to Architect.
- C. Clean unit surfaces. Touch up, refinish, or replace damaged components in a manner acceptable to Architect.

END OF SECTION

SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL**1.1 SUMMARY**

- A. Section includes surface preparation and field application of painting and coating systems.
- B. Related Requirements:
 - 1. Sections including work indicated to receive painting and coating.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
 - 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2020.
- B. California Department of Public Health (CDPH):
 - 1. CDPH Standard Method VOC v1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- C. GreenSeal, Inc. (GS):
 - 1. GreenSeal GS-11 - Standard For Paints, Coatings, Stains, and Sealers; 2021.
- D. Painting and Decorating Contractors of America (PDCA):
 - 1. PDCA - Architectural Painting Specification Manual; Current Edition.
- E. Society for Protective Coatings (SSPC):
 - 1. SSPC V1 (PM1) - Good Painting Practice: Painting Manual Volume 1; 2016.
 - 2. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual Volume 2; 2021.
 - 3. SSPC SP 13 - Surface Preparation of Concrete; 2018.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on all finishing products.
- C. Samples for Initial Selection: Submit two paper chip samples; 2 x 3 inches in size; illustrating range of colors, sheens, and textures available for each surface finishing product indicated; submit for Architect's initial selections.
 - 1. For clear top coats on stained wood, samples to illustrate range of colors and sheens available as applied to wood species required in construction.
 - 2. For clear top coats on non-stained wood, samples to illustrate sheens available as applied to wood species required in construction.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected color, sheen, and texture. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. For opaque paint samples, submit each on tempered hardboard; minimum 8 x 8 inches.
 2. For clear top coats on stained and non-stained wood; submit each on finished wood species required in construction; minimum 8 x 8 inches.
- E. Manufacturer's Installation Instructions: Submit special surface preparation procedures and substrate conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Applicator: Company specializing in performing work of this section with minimum ten (10) years documented experience.

1.7 MOCKUP

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. Construct mockup, in one room, illustrating coating color, sheen, texture, and finish.
- C. Locate where directed by Architect.
- D. Incorporate accepted mockup as part of Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. 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.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior, unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior and exterior, unless required otherwise by manufacturer's instructions.

- F. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish five (5) year manufacturer warranty for paints and coatings.
- C. Contractor to provide a one (1) year warranty on all defects.
- D. Installer to provide a two (2) year warranty on all materials and workmanship.

1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 - 1. Supply 1 gallon of each color, sheen, type, and surface texture; store as directed by Owner.
 - 2. Label each container with color, sheen, type, surface texture and room locations, in addition to manufacturer's label.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

- A. Manufacturers:
 - 1. Benjamin Moore (BM).
 - 2. PPG Paints (PPG).
 - 3. Sherwin-Williams Company (SW).
 - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design Manufacturer (BOD):
 - 1. Sherwin-Williams Company (SW) unless indicated otherwise as follows:
 - a. Comply with SCHEDULE article in PART 3 of this Section if BOD is indicated other than that indicated above.
 - b. Comply with Drawings if BOD is indicated other than that indicated in this Section.
 - c. Manufacturer, product, and finish sheen to be as indicated in SCHEDULE article in this Section unless indicated otherwise on Drawings.
- C. Provide paints and finishes from the same manufacturer to the greatest extent possible.
 - 1. If a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

2.2 COMPONENTS

- A. Conditioners, primers, and other undercoating products are to be of same manufacturer as top coat manufacturer unless top coat manufacturer recommends otherwise in writing.
- B. All materials and paints shall be lead and mercury free and shall have low VOC content where possible.
- C. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
 - 1. Prepare coatings to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
 - 2. Prepare coatings for consistent flow and brushing properties.
 - 3. Prepare coatings capable of drying and curing free of streaks or sags.

4. Interior Flat and Non-Flat Paints:
 - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC v1.2.
 5. Interior Anti-Corrosive Paints:
 - a. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC v1.2.
 6. Interior Clear Wood Finishes: Maximum volatile organic compound content in accordance with CDPH Standard Method VOC v1.2.
- D. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.
1. Interior Clear Wood Finishes: Maximum volatile organic compound content in accordance with CDPH Standard Method VOC v1.2.
- E. Patching Materials: To be compatible with the substrate and paint/coating materials; use latex patching materials where compatible with substrate and paint/coating materials; use tinted or stainable patch materials where wood substrates are indicated to be stained.
- F. Recessed Fastener Head Filler Materials: To be compatible with the substrate and paint/coating materials; use latex filler materials where compatible with substrate and paint/coating materials; use tinted or stainable patch materials where wood substrates are indicated to be stained.

2.3 COLORS, SHEENS, AND LOCATIONS FOR APPLICATION

- A. Drawings and Schedules on Drawings provide additional information regarding Colors, Sheens, Basis of Design (BOD), and Locations.
1. Other Colors and Locations to be as selected by Architect from manufacturer's full range.
- B. Sheen designation indicated on Drawings supersedes sheen designations indicated in this Section.
1. In such case, provide manufacturer and named products indicated in this Section, but with sheen indicated on Drawings.
- C. Indicated color codes in this Section and on Drawings are only for the purpose of color matching and does not alter requirements for products, manufacturers, or named products.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify surfaces are ready to receive Work as instructed by product manufacturer.
- C. Examine surfaces indicated to be finished prior to commencement of work. Report conditions capable of negatively affecting proper application or finished appearance of the work.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces is in accordance with the coating manufacturer's recommendations and is below the following maximums:
1. Gypsum Wallboard: 12 percent.
 2. Masonry, Concrete and Concrete Unit Masonry: 12 percent.
 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Concrete Floors and Traffic Surfaces: 8 percent.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section. Prepare materials to be installed and equipment used during installation.
- B. Preparations to be executed with methods and materials compatible with paints and coatings to be applied.
- C. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces thoroughly prior to applications.
- E. Seal marks and surfaces that might cause bleed-through or staining of top coat.
- F. Remove marks and foreign matter from substrates indicated for transparent or semi-transparent coatings.
- G. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- H. Aluminum Surfaces Indicated for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- I. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- J. Gypsum Board Surfaces: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled fastener heads and tape joints must be sanded smooth, and all dust removed prior to painting. Exterior surfaces must be spackled with exterior grade compounds. Fill minor defects with filler compound. Spot prime defects after repair.
- K. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- L. Concrete: Remove release agents, curing compounds, efflorescence, irregular surfacing, foreign matter, stains, chalk, and laitance. Prepare surface as recommended by finishes manufacturer and according to SSPC SP 13. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds the lesser of that permitted in manufacturer's written instructions and that indicated in this Section. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- M. Concrete Floors Requiring Sealed Finish (Does not include Polished Concrete Floor Finishing; refer to Division 3):
 1. Use preparation procedures and products as recommended by manufacturer of sealer finish for concrete floors.
- N. Masonry Surfaces Indicated to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

- O. Plaster and Parged Surfaces: Fill hairline cracks, small holes, and imperfections with patching material compatible with the plaster and the indicated coatings. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- P. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand power tool wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring welded joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- Q. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- R. Surfaces Indicated to Receive Fire-Retardant Intumescent Paint: Use preparation procedures and products as recommended by manufacturer of Intumescent Paint system.
- S. Metal Doors and Frames Indicated for Painting: Prime metal door top and bottom edge surfaces.
- T. Wood Surfaces:
 - 1. Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried. Prime filled areas, sanding between coats. For exterior applications, back prime concealed surfaces of material before installation.
 - 2. Transparent Finish: Wipe off dust and grit prior to application of finishing materials. Fill nail holes and cracks with stainable filler or filler tinted to match the intended final wood appearance. For exterior applications, prime concealed surfaces with indicated finish material.
- U. Glue-Laminated Wood Beams Indicated for Field Applied Finishing: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
- V. Floor and Roof Concrete Planks: Where underside of planks is exposed to view, install continuous joint sealant materials to seal joints including joints between planks, around perimeters and voids.
- W. PVC, Vinyl and Architectural Plastic: Clean and lightly sand surfaces to be coated. Use preparation procedures and products as recommended by substrate manufacturer and manufacturer of coating system.

3.3 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. For concrete masonry units and other porous masonry and cementitious materials indicated to receive painting/coating, apply the primer coating as needed to fill all pinholes prior to applying finish top coats.
- D. Sand surfaces lightly between coats to achieve required finish.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Where clear finishes are required, tint fillers to match wood and apply to match wood texture. Remove excess from surface.
- G. Prime concealed surfaces of interior woodwork with primer paint.

- H. Finishing Mechanical and Electrical Equipment:
1. Paint shop primed equipment. Paint shop finished items occurring at interior areas.
 2. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately. Reinstall after paint is cured.
 3. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
 4. Paint interior surfaces of air ducts visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles, to match face panels.
 5. Paint exposed conduit and electrical equipment occurring in finished areas.
 6. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
 7. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- I. Finishing Overhead Construction Indicated as Open To Structure (exposed to view):
1. This provision includes finishing of overhead construction above suspended ceilings and clouds that do not extend to wall. This condition allows overhead construction to be seen above and over the suspended ceiling or cloud. Therefore, such overhead construction must be painted to eliminate unsightly overhead conditions that are visible.
 2. This provision does not include mechanical and electrical utility rooms, unless indicated otherwise on Drawings.
 3. Apply fast-drying, flat interior dry-fall type alkyd to all overhead construction Work and surfaces. Such surfaces include, but are not limited to, roof decking, structural steel, bracing and supports, and mechanical and electrical work.
 - a. Dry-Fall application does not apply to the following:
 - 1) Items with manufacturer's fully prefinished final coatings such as light fixtures, life safety devices and required warning postings.
 - 2) Surfaces scheduled to receive manufacturer's fully prefinished final coatings or field applied coatings other than Dry-Fall. Such surfaces may include wood laminated beams and underside of wood plank ceilings.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.5 SCHEDULE - EXTERIOR SURFACES

- A. Surfaces Indicated to Receive Fire-Retardant Intumescent Paint System:
1. Refer to Drawings for designated locations, required fire-retardant rating, and applicable UL Design.
 2. The intumescent paint system includes application of the intumescent paint and its primer.
 3. Thicknesses of intumescent paint system components are to be as required to achieve the required fire-retardant rating.
 4. Confirm with the intumescent paint system manufacturer, the paint system adhesion compatibility with the substrate material.
 5. Intumescent Paint System:
 - a. Albi Clad 800 with primer as recommended by manufacturer.
 - b. Isolatak - WB5 with primer as recommended by manufacturer.

6. Comply with intumescent paint system manufacturer's recommendations for cure time prior to application of finish paint system.
 7. Finish paint system is to be applied over fully cured intumescent paint system and is to be as indicated below in accordance with the substrate type. Confirm compatibility of finish paint system with respective paint system manufacturers.
- B. Exterior Steel - Unprimed:
1. One coat of alkyd primer.
 - a. BM - Super Spec HP Alkyd Metal Primer P06.
 - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
 - c. SW - All Surface Enamel Interior-Exterior Alkyd Primer.
 2. Two top coats of alkyd enamel finish.
 - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
 - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
 - c. SW - SWP Exterior Oil Base Gloss.
- C. Exterior Steel - Primed:
1. One coat of alkyd primer.
 - a. BM - Super Spec HP Alkyd Metal Primer P06.
 - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
 - c. SW - All Surface Enamel Interior-Exterior Alkyd Primer.
 2. Two top coats of alkyd enamel finish.
 - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
 - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
 - c. SW - SWP Exterior Oil Base Gloss.
- D. Exterior Steel - Primed (Epoxy Coating):
1. One coat of epoxy primer.
 - a. BM - Corotech Surface Tolerent Epoxy Mastic V160.
 - b. PPG - Amerlock 600 Polyamide Epoxy Coating.
 - c. SW - Macropoxy 646 Fast Cure Epoxy Mastic Semi-Gloss.
 2. One coat of epoxy body coat.
 - a. BM - Corotech Surface Tolerent Epoxy Mastic V160.
 - b. PPG - Amerlock 600 Polyamide Epoxy Coating.
 - c. SW - Macropoxy 646 Fast Cure Epoxy Mastic Semi-Gloss.
 3. One top coat of urethane finish.
 - a. BM - Corotech Aliphatic Acrylic Urethane Gloss V500.
 - b. PPG - Pitthane Ultra Acrylic Aliphatic Urethane Gloss 95-812 Series.
 - c. SW - Hi-Solids Polyurethane Gloss B65-300.
- E. Exterior Steel - Galvanized:
1. One coat of alkyd primer.
 - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
 - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
 - c. SW - Galvite HS Alkyd Modified Acrylic Primer.
 2. Two top coats of alkyd enamel finish.
 - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
 - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
 - c. SW - SWP Exterior Oil Base Gloss.
- F. Exterior Aluminum - Mill Finished:
1. One coat of alkyd primer.
 - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
 - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
 - c. SW - Galvite HS Alkyd Modified Acrylic Primer.
 2. Two top coats of alkyd enamel finish.

- a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
 - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
 - c. SW - SWP Exterior Oil Base Gloss.
- G. Exterior Concrete Masonry Units:
- 1. Two coats of block filler.
 - a. BM - Ultra Spec Hi-Build Masonry Block Filler 571.
 - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler.
 - c. SW - Loxon Acrylic Block Surfacer A24/LX01 Series.
 - 2. Two top coats of latex finish.
 - a. BM - Ultra Spec EXT Finish Satin N448.
 - b. PPG - Speedhide Exterior Acrylic Flat.
 - c. SW - SuperPaint Exterior Acrylic Latex Flat.
- H. Exterior PVC, Vinyl, and Architectural Plastic:
- 1. One coat of primer.
 - a. BM - INSL-X Stix Waterborne Bonding Primer.
 - b. PPG - Rust-Oleum XIM UMA Advanced Technology Primer Sealer Bonder.
 - c. SW - Extreme Bond Interior-Exterior Bonding Primer.
 - 2. Two top coats of acrylic finish.
 - a. BM - Command Waterborne Acrylic Urethane Satin.
 - b. PPG - Break-Through 50 Interior-Exterior Acrylic Satin.
 - c. SW - A-100 Exterior Latex Flat.

3.6 SCHEDULE - INTERIOR SURFACES

- A. Interior Surfaces Indicated to Receive Fire-Retardant Intumescent Paint System:
- 1. Refer to Drawings for designated locations, required fire-retardant rating, and applicable UL Design.
 - 2. The intumescent paint system includes application of the intumescent paint and its primer.
 - 3. Thicknesses of intumescent paint system components are to be as required to achieve the required fire-retardant rating.
 - 4. Confirm with the intumescent paint system manufacturer, the paint system adhesion compatibility with the substrate material.
 - 5. Intumescent Paint System:
 - a. Albi Clad 800 with primer as recommended by manufacturer.
 - b. Isolatak - WB5 with primer as recommended by manufacturer.
 - 6. Comply with intumescent paint system manufacturer's recommendations for cure time prior to application of finish paint system.
 - 7. Finish paint system is to be applied over fully cured intumescent paint system and is to be as indicated below in accordance with the substrate type. Confirm compatibility of finish paint system with respective paint system manufacturers.
- B. Interior Concrete Masonry Units:
- 1. Two coats of block filler unless indicated otherwise.
 - a. BM - Ultra Spec Hi-Build Masonry Block Filler 571.
 - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler.
 - c. SW - PrepRite Interior-Exterior Latex Block Filler.
 - 2. Two top coats of latex finish.
 - a. BM - Ultra Spec 500 Interior Acrylic Finish Semi-Gloss T546.
 - b. PPG - Speedhide Zero VOC Interior Latex Semi-Gloss.
 - c. SW - ProMar 200 Zero VOC Interior Latex Semi-Gloss.
 - 3. Special Requirement:
 - a. Three coats block filler.

- b. Two top coats finish.
 - c. Locations:
 - 1) Lobby Areas.
 - 2) Corridors.
 - 3) Stair Areas.
- C. Interior Concrete Masonry Units (Epoxy Coating):
- 1. Two coats of epoxy block filler, unless otherwise indicated.
 - a. BM - Corotech Acrylic Block Filler V114.
 - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler 6-15XI.
 - c. SW - Pro Industrial Heavy Duty Block Filler.
 - 2. Two top coats of acrylic epoxy finish.
 - a. BM - Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss.
 - b. PPG - Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy Semi-Gloss.
 - c. SW - Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.
 - 3. Special Requirement:
 - a. Three coats minimum, block filler.
 - b. Two top coats, minimum, finish.
 - c. Locations:
 - 1) Food Preparation and Dining Areas such as:
 - a) Kitchen Areas.
 - b) Food Serving Areas.
 - c) Dishwashing Areas.
 - d) Food Storage Areas.
 - e) Kitchen Office Areas.
 - f) Kitchen Toilet and Locker Areas.
 - g) Dining Areas.
 - h) Cafeterias.
 - 2) Toilets and Janitor Closets.
 - 3) Locker Rooms.
 - d. Apply additional coats as required to achieve even surface finish acceptable to the local Health Department having jurisdiction.
 - e. All surfaces must be acceptable to Health Department officials and pass the “ketchup test” requirements.
- D. Interior Parge Finished Masonry (Epoxy Coating):
- 1. One coat, minimum of epoxy block filler.
 - a. BM - Corotech Acrylic Block Filler V114.
 - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler 6-15XI.
 - c. SW - Pro Industrial Heavy Duty Block Filler.
 - 2. Two top coats, minimum of acrylic epoxy finish.
 - a. BM - Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss.
 - b. PPG - Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy Semi-Gloss.
 - c. SW - Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.
 - 3. Apply additional coats as required to achieve even surface finish acceptable to the local Health Department having jurisdiction.
 - 4. All surfaces must be acceptable to Health Department officials and pass the “ketchup test” requirements.
- E. Interior Concrete Floors Requiring Sealed Finish: This provision is only for concrete floors indicated to have Sealed Concrete Finish. It is not intended for Stained and Polished Concrete Floors that would be indicated in Section 03 35 43 - Polished Concrete Finishing.
- 1. One coat Liquid Densifier: Penetrating lithium silicate sealer, hardener, and densifier.
 - a. Prosoco - Consolideck LS Hardener/Densifier. (Basis of Design)
 - b. Convergent Concrete Technologies - Pentra-Sil (HD).

- c. Ameripolish - Ameripolish 3D HS.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
 - 2. Two coats Protective Treatment: Penetrating lithium silicate protective treatment.
 - a. Prosoco - Consolideck PolishGuard Finish. (Basis of Design)
 - b. Convergent Concrete Technologies - Pentra-Finish (HG).
 - c. Ameripolish - Ameripolish SR2.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
- F. Interior Steel - Unprimed:
 - 1. One coat of acrylic primer.
 - a. BM - Corotech Acrylic Metal Primer V110.
 - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
 - c. SW - Pro Industrial Pro-Cryl Universal Primer.
 - 2. Two top coats of acrylic enamel finish.
 - a. BM - Corotech Acrylic DTM Enamel Semi-Gloss V331.
 - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
 - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- G. Interior Steel - Primed:
 - 1. One coat of acrylic primer.
 - a. BM - Corotech Acrylic Metal Primer V110.
 - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
 - c. SW - Pro Industrial Pro-Cryl Universal Primer.
 - 2. Two top coats of acrylic enamel finish.
 - a. BM - Corotech Acrylic DTM Enamel Semi-Gloss V331.
 - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
 - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- H. Interior Steel - Galvanized:
 - 1. One coat acrylic primer.
 - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
 - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
 - c. SW - Pro Industrial Pro-Cryl Universal Primer.
 - 2. Two top coats of acrylic enamel finish.
 - a. BM - Advance Waterborne Interior Alkyd Semi-Gloss.
 - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
 - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- I. Interior Aluminum - Mill Finished:
 - 1. One coat acrylic primer.
 - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
 - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
 - c. SW - Pro Industrial Pro-Cryl Universal Primer.
 - 2. Two top coats of acrylic enamel finish.
 - a. BM - Advance Waterborne Interior Alkyd Semi-Gloss.
 - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
 - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- J. Interior Gypsum Board - Walls:
 - 1. One coat latex primer sealer.
 - a. BM - Ultra Spec 500 Interior Latex Primer.
 - b. PPG - Pure Performance Interior Acrylic Primer.
 - c. SW - ProMar 200 Zero VOC Interior Latex Primer.
 - 2. Two top coats of latex finish.
 - a. BM - Ultra Spec 500 Interior Latex Finish Eggshell
 - b. PPG - Speedhide Zero VOC Interior Latex Eggshell.

- c. SW - ProMar 200 Zero VOC Interior Latex Eg-Shel.
- K. Interior Gypsum Board - Walls (Epoxy Coating):
 - 1. One coat of epoxy primer sealer.
 - a. BM - INSL-X Aqua Lock Plus.
 - b. PPG - Pure Performance Interior Acrylic Primer.
 - c. SW - ProMar 200 Zero VOC Interior Latex Primer.
 - 2. Two top coats of acrylic epoxy finish.
 - a. BM - Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss.
 - b. PPG - Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy Semi-Gloss.
 - c. SW - Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.
 - 3. Locations Include:
 - a. Food Preparation and Dining Areas such as:
 - 1) Kitchen Areas.
 - 2) Food Serving Areas.
 - 3) Dishwashing Areas.
 - 4) Food Storage Areas.
 - 5) Kitchen Office Areas.
 - 6) Kitchen Toilet and Locker Areas.
 - 7) Dining Areas.
 - 8) Cafeterias.
 - b. Toilets and Janitor Closets.
 - c. Locker Rooms.
- L. Interior Gypsum Board - Ceilings and Bulkheads:
 - 1. One coat latex primer sealer.
 - a. BM - Ultra Spec 500 Interior Latex Primer.
 - b. PPG - Pure Performance Interior Acrylic Primer.
 - c. SW - ProMar 200 Zero VOC Interior Latex Primer.
 - 2. Two top coats of latex finish.
 - a. BM - Ultra Spec 500 Interior Latex Finish Flat.
 - b. PPG - Speedhide Zero VOC Interior Latex Flat.
 - c. SW - ProMar 200 Zero VOC Interior Latex Flat.
- M. Interior Insulated Coverings - Canvas and Cotton:
 - 1. One coat of latex primer sealer.
 - a. Same as Gypsum Board - Ceilings and Bulkheads.
 - 2. Two top coats of latex finish.
 - a. Same as Gypsum Board - Ceilings and Bulkheads.
 - 1) Sheen: Flat.
- N. Interior Dry Fall (Dry Fog):
 - 1. One coat of primer sealer.
 - a. Product recommended by top coat manufacturer for each substrate type.
 - 2. Two top coats of acrylic finish.
 - a. BM - Coronado Super Kote 5000 Dry Fall Acrylic Latex Flat.
 - b. PPG - Speedhide Super Tech WB Interior Dry Fog Flat.
 - c. SW - Pro Industrial Waterborne Acrylic Dryfall Flat.
- O. Interior Wood (Paint Coating):
 - 1. One coat of primer sealer.
 - a. BM - Ultra Spec 500 Interior Latex Primer.
 - b. PPG - Pure Performance Interior Acrylic Primer.
 - c. SW - PrepRite ProBlock Interior-Exterior Latex Primer.
 - 2. Two top coats of latex finish.
 - a. BM - Ultra Spec 500 Interior Semi-Gloss

- b. PPG - Speedhide Interior Latex Semi-Gloss
 - c. SW - ProMar 200 Zero VOC Interior Latex Semi-Gloss.
- P. Interior Wood (Stain):
- 1. Stain:
 - a. BM - Product recommended by top coat manufacturer for substrate type.
 - b. PPG - DEFT Interior Oil Based Stain.
 - c. SW - Minwax Performance Series Tintable Interior Wood Stain.
 - 2. Three top coats finish:
 - a. Refer to Wood - Transparent Top Coat on Stained below.
- Q. Interior Wood (Transparent Top Coat on Stained Wood and Non-Stained Wood):
- 1. One coat sealer.
 - a. Product recommended by top coat manufacturer for substrate type.
 - 2. Three top coats of transparent acrylic coating.
 - a. BM - Lenmar Aqua-Plastic Acrylic Urethane Clear Semi-Gloss.
 - b. PPG - DEFT Interior Polyurethane Water Based Acrylic Semi-Gloss.
 - c. SW - Minwax Water-Based Oil-Modified Polyurethane Clear Semi-Gloss.

END OF SECTION

SECTION 10 11 00
VISUAL DISPLAY UNITS

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Porcelain Marker Board Units.
 - 2. Tack Board Units.
 - 3. Map Rails.
- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry: Substrate construction.
 - 2. Section 09 21 16 - Gypsum Board Assemblies: Substrate construction.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
 - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. American National Standards Institute (ANSI):
 - 1. ANSI A135.4 - Basic Hardboard; 2012, Reapproval 2020.
 - 2. ANSI A208.1 - Particleboard; 2022.
 - 3. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015, Reapproval 2020.
- C. ASTM International (ASTM):
 - 1. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.
 - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
 - 3. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2022.
 - 4. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
 - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 6. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2020.
- D. The Engineered Wood Association (APA):
 - 1. APA PS 1 - Structural Plywood; 2022, Revised 2023.
- E. California Department of Public Health (CDPH):
 - 1. CDPH Standard Method VOC V1.2 - Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers - Version 1.2; 2017.
- F. Code of Federal Regulations (CFR):
 - 1. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Product Data: Provide data for each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.
- C. Shop Drawings: Provide dimensioned drawings for each visual display unit.
 - 1. Include plans, elevations, sections, and attachment/anchor details per substrate type.
 - 2. Include schedule of unit descriptions sorted by room numbers from Drawings.
 - 3. Show locations and details of factory-assembled joints. Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.
 - 4. Show locations and layout of graphics indicated.
 - 5. Include sections of typical trim members.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes, colors, and patterns available for products. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Manufacturer recommendations to include:
 - 1. Care and maintenance instructions.
 - 2. Installation instructions.
 - 3. Specifications for recommended surface markers and erasers.
 - 4. Replacement parts data and optional accessories data.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.

1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Warranty period is to begin on the project's date of Substantial Completion.
- C. General: Provide warranty for visual display units not indicated otherwise.
 - 1. Provide five (5) year manufacturer's warranty for visual display surfaces in which manufacturer agrees to replace defective materials or installation.
- D. Porcelain Marker Boards: Provide fifty (50) year manufacturer's warranty in which manufacturer agrees to replace marker boards that exhibit any of the following defects:
 - 1. Defects in materials or workmanship.
 - 2. Discoloration, staining, ghosting or excessive fading of color.
 - 3. Crazing, cracking, or flaking.
 - 4. Warranty does not cover the cost of removal or reinstallation.

1.7 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 - 1. Dry Erase Markers and Erasers: Provide the following for each porcelain marker board and each glass marker board installed.

- a. One (1) pack of color markers; black, red, blue, and green colors.
- b. One (1) block type dry eraser.
- c. One (1) cloth type dry eraser.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Visual display units to be manufactured and factory assembled units.
- B. Laminated components are to be factory laminated, not field laminated.
- C. Surface-Burning Characteristics: Comply with ASTM E 84.
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 50 or less.

2.2 MANUFACTURERS

- A. Manufacturers:
 1. AJW Architectural Products.
 2. ASI Visual Display Products.
 3. Clarus.
 4. Claridge Products and Equipment.
 5. Dreamwalls by Gardner Glass Products.
 6. Egan Visual Corporation.
 7. Ghent Manufacturing Inc.
 8. Marsh by Polyvision.
 9. Nelson Adams NACO.
 10. Substitutions: Section 01 60 00 - Product Requirements.

2.3 PORCELAIN MARKER BOARD UNITS

- A. Porcelain Marker Boards:
 1. Outer Face Sheet: Porcelain enameled steel sheet.
 - a. Colors: As selected by Architect from manufacturer's full range.
 2. Core: Particle board, 1/2 inch thick.
 3. Vapor Barrier Backing: Aluminum sheet backing laminated to panel back.
 4. Sizes and Configurations:
 - a. As indicated on Drawings.
 5. Splice Joints: Used only as indicated on Drawings or otherwise approved by Architect.
 - a. Concealed Splice Joint: Extruded aluminum to be factory applied. Finished joint is to be hairline tight with flush aligned face planes of joined panels.
 - 1) Continuous metal spline type.
 6. Graphics Application: Factory fused-on graphics to be applied only to marker boards indicated on Drawings to have graphics. Painted-on graphics are not acceptable.
 - a. Graphics are to be as follows unless indicated otherwise on Drawings:
 - 1) Music Staff Lines:
 - a) Each Staff: Five (5) lines.
 - b) Line Spacing: 1 inch between each line.
 - c) Space Between Each Staff (equal spaces): 3 to 5 inches.
 - d) Border at Top & Bottom: 5 inches.
 - e) Line Thickness: 1/16 inch.
 - f) Length of Lines: As indicated on Drawings.
 - 2) Other graphics as may be indicated on Drawings.

7. Edge Treatment:
 - a. Frame: Extruded aluminum; 3/4 inch width.
8. Divider Joint: Extruded aluminum; continuous along full length of joint.
 - a. Style:
 - 1) H-style bar with flat face and integral wall anchor flange on back.
 - 2)
 - b. Exposed Finish:
 - 1) Match frame.
9. Mount: Anchor marker board to support construction.
 - a. Concealed continuous cleat anchor Z-rails.
 - b. Concealed continuous anchor flange integral to extruded frame assembly.
10. Marker Tray: Extruded aluminum, one-piece full length of marker board, concealed fasteners, and cast aluminum end caps.
 - a. Profile:
 - 1) Shape to be one piece triangular box profile.
 - b. In physical activity spaces such as weightlifting rooms, dance studios, gyms, and multi-purpose rooms, do not provide protruding marker trays. Provide recessed type marker trays.
11. Map Rail: Provide at top and full length of each marker board.
 - a. Provide as indicated in Map Rail article of this Section.
12. Cleaning Instruction Plate: Provide instructions for marker board cleaning on metal plate fastened to perimeter frame near marker tray.
13. Accessories: As recommended by marker board manufacturer.
 - a. Dry Erase Markers: Provide for each marker board.
 - 1) One (1) pack of color markers; black, red, blue, and green colors.
 - b. Dry Erase Marker Erasers: Provide for each marker board.
 - 1) Two (2) cloth type or microfiber shag type erasers.
 - 2) Two (2) block type erasers.
 - c. Magnetic Pins: Provide for each marker board.
 - 1) Formed shape to provide firm finger-grip pull function.
 - 2) Colors: Black, red, blue, and green; equal quantities.
 - 3) Quantity: Eight (8) magnetic pins.
 - d. Magnetic Caddy: Provide for each marker board.
 - 1) Formed to hold markers and erasers with double compartment.
 - 2) Size: 7 W x 5 H x 3-1/2 D inches with open top.
 - 3) Wire mesh sides, bottom, and compartment divider; open top.
 - 4) Finish: Powder coat finish; black color.
 - 5) Quantity: One (1) magnetic caddy.

2.4 TACK BOARD UNITS

- A. Laminated Components:
 1. 1/4 inch composition cork; 1/4 inch hardboard; aluminum foil backing.
- B. Board Sizes and Configurations:
 1. As indicated on Drawings.
- C. Edge Treatment:
 1. Frame: Extruded aluminum; 3/4 inch width.
- D. Corner Style:
 1. Square; mitered joint.
- E. Divider Joint: Extruded aluminum; continuous along full length of joint.
 1. Style:
 - a. H-style bar with flat face and integral wall anchor flange on back.

2. Exposed Finish:
 - a. Match frame.
- F. Colors and Patterns: As selected by Architect from manufacturer's full range.
- G. Mount: Anchor tack board to support construction.
 1. Concealed continuous cleat anchor Z-rails.
 2. Concealed continuous anchor flange integral to extruded frame assembly.
- H. Map Rail: Provide at top and full length of each tack board.
 1. Provide as indicated in Map Rail article of this Section.

2.5 MAP RAILS

- A. Map Rails: Extruded aluminum rails; tackable insert; top and bottom track flanges for mounting map rail accessories; concealed fasteners; end caps.
 1. Size: Length as indicated in this Section, unless indicated otherwise on Drawings.
 - a. 1 inch wide.
 2. Tackable Insert: Applied to full length of rail.
 - a. Composition cork.
 3. Map Rail Accessories: Aluminum and sized to securely fit and slide along rail size indicated. Provide the following for each map rail.
 - a. 1 flag holder, and 1 for each additional 20 linear feet of rail.
 - b. 1 pair of map hooks, and 1 pair for each additional 10 linear feet of rail.
 - c. 1 pair of roller brackets, and 1 pair for each additional 10 linear feet of rail.
 4. Colors: As selected by Architect from manufacturer's full range.

2.6 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on porcelain enamel finish.
 1. Steel Sheet Thickness:
 - a. 24 gauge (0.024 inch) (0.61 mm).
 2. Porcelain Enameling System: Coat faces and edges with three coat porcelain enameling system consisting of primer, ground coat, and color cover coat. Total thickness of coating system to be not less than 4 mil (0.10 mm) thick.
 - a. System to be fusion bonded to steel sheet at suitable temperature as to reduce steel and porcelain stresses, and to achieve superior enamel bond and hardness.
 - b. Writing surface is to be non-porous, provide magnetic function, is to be uniform in hardness, color, and texture, and is to wipe clean with dry eraser or cloth without staining or ghosting.
- B. Wood Composite Materials: Sanded smooth on all sides. Maximum volatile organic content to comply with CDPH Standard Method VOC V1.2.
 1. Hardboard: ANSI A135.4, Class 1 - Tempered.
 2. Fiber Board: ASTM C208, cellulosic fiber insulating board.
 3. MDF Board: ANSI A208.2, Grade 130 minimum.
 4. Particleboard: ANSI A208.1, Grade M-1, wood chips, with waterproof resin binder.
 5. Plywood:
 - a. APA PS 1 Grade A-B, softwood.
- C. Aluminum Foil Backing: 0.005 inch (0.13 mm) thick minimum.
- D. Aluminum Sheet Backing: 27 gauge (0.014 inch) (0.36 mm) thick minimum.
- E. Steel Sheet Backing: 28 gauge (0.015 inch) (0.38 mm) thick minimum, galvanized.

- F. Cork Materials: Seamless application. Colors as selected by Architect from manufacturer's full range.
 - 1. Composition Cork: Formulation of finely ground cork, oxidized linseed oils, rosin binders, and pigments forming a solid uniform colored composition cork; 1/4 inch thick and burlap back reinforcing.
 - 2. Natural Cork: Fine grain natural cork, homogeneous composition. 1/4 inch thick.
- G. Fabric Materials: Seamless application. Colors and patterns as selected by Architect from manufacturer's full range.
 - 1. Vinyl Coated Fabric: Vinyl coated fabric complying with ASTM F793 Category VI.
 - 2. Woven Fabric: 100 percent polyester; weighing not less than 15 oz/sq yd.
- H. Extruded Aluminum: Comply with ASTM B221, 6063 alloy, T5 temper. Free of extruding draw marks and surface scratches.
 - 1. Extruded Aluminum Frames, Trim, and Components: Sizes and shapes as indicated and to suit use and installation type; factory applied to visual display units; single length extrusions when possible; keep joints to a minimum; concealed fasteners; mitered corners to an aligned and hairline closure and without sharp edges.
 - a. Extrusion Wall Thickness:
 - 1) 0.062 inch thick minimum.
 - b. Color:
 - 1) As selected by Architect from manufacturer's full range, unless indicated otherwise.
- I. Adhesives: Products recommended by manufacturer of visual display item for substrate to which item is to be adhered. Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
- J. Temporary Protective Cover: 8 mil polyethylene protective sheet factory applied to finish surfaces of products. Cover to be removable without damage to finishes.
- K. Magnetized Devices and Accessories: Magnets to be of magnetic alloy of rare earth elements. Functions to affix devices to marker boards that include steel sheet material.

2.7 ALUMINUM FINISHES

- A. Class II Natural Anodized Finish: AAMA 611 AA-M12C22A31 Clear anodic coating not less than 0.4 mils (0.01 mm) thick.
- B. Class II Color Anodized Finish: AAMA 611 AA-M12C22A32 integrally colored or AA - M12C22A34 electrolytically deposited colored anodic coating not less than 0.4 mil (0.01 mm) thick.
- C. Baked-Enamel or Powder-Coat Finish: AAMA 2603, except with a minimum dry film thickness of 1.5 mil (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting Work.
- B. Verify that surfaces and conditions are ready to accept the Work of this Section. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify substrate support construction and required internal support blocking are sufficient and ready to receive Work.

- D. Verify that positioning dimensions are as indicated on Drawings and that substrates are free of obstructions.
- E. Examine products to be installed for damage and other conditions detrimental to completion of the Work.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install visual display units at locations and heights indicated on Drawings.
- C. Install visual display units level and plumb with concealed fastening hardware and anchor securely to support construction.
- D. Panels indicated to be joined with concealed spline are to be butted tightly. Finished joint is to be hairline tight with flush aligned face planes of joined panels.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Cover visual display unit surfaces with protective cover. Protective cover to be removable without damage to surfaces.
- C. Remove temporary protective cover at Final Inspection.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

END OF SECTION

SECTION 10 14 00**SIGNAGE****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Room Identification Signs.
 - 2. Applied Vinyl Graphics.
 - 3. Dimensional Letter Signs.
 - 4. Notification Signs.
 - 5. Fire Protection Signs.
 - 6. Warning Stencils.
 - 7. Dedication Plaque.
 - 8. LED Screen Marquee Signs: For digital information display.
- B. Related Requirements:
 - 1. Sections related to identification of Plumbing, HVAC, and Electrical work.
 - 2. Sections related to Civil and Site work.

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI Z97.1 - Safety Glazing Materials Used In Buildings - Safety Performance Specifications And Methods Of Test; 2015, Reaffirmed 2020.
- B. Americans with Disabilities Act (ADA):
 - 1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; Current Edition.
- C. ASTM International (ASTM):
 - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
 - 3. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
- D. Code of Federal Regulations (CFR):
 - 1. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; Current Edition.
- E. International Code Council (ICC):
 - 1. ICC A117.1 - Accessible and Usable Building and Facilities; 2017.
- F. International Electrotechnical Commission (IEC):
 - 1. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code); 1989, With Amendments Through 2013.
- G. UL Standards (UL):
 - 1. UL 48 - Electric Signs; Edition 15, 2011, With Revisions Through 2023.
 - 2. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing the material, fabrication standards and characteristics of the sign systems indicated in the Section and other Contract Documents.
- C. Shop Drawings: Indicate sign types, styles, lettering font, copy, graphics, features, foreground and background colors, locations, overall dimensions of each sign and attachment method.
 - 1. Indicate connection locations for signage requiring electrical or communication wiring.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for each sign type; include color options for backgrounds, graphics, and copy; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 6 x 8 inches illustrating sign type, sign features, graphics, and method of attachment. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit installation template and attachment devices.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Package signs, labeled in name groups.
- C. Store adhesive attachment tape at ambient room temperatures.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- C. Maintain this minimum temperature during and after installation of signs.

1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. LED Marquee Signs: Provide warranties indicated in the description of the LED Marquee Sign in this Section.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Conform to current local and state building codes; ADA Standards; 36 CFR 1191; and ICC A117.1 guidelines for manufacture and installation of interior identification signs.

- B. Conform to current International Fire Code requirements.

2.2 MANUFACTURERS

- A. Manufacturers:
1. Acorn Sign Graphics.
 2. APCO Graphics.
 3. ASI Sign Systems.
 4. Bayuk Graphic Systems, Inc.
 5. Best Sign Systems.
 6. Gemini, Inc.
 7. Interface Architectural Signage, Inc.
 8. InPro Corporation (Signscape).
 9. Mohawk Sign Systems.
 10. Rowmark, LLC.
 11. Scott Sign Systems, Inc.
 12. Signage Industries Corporation.
 13. Substitutions: Section 01 60 00 - Product Requirements.

2.3 ROOM IDENTIFICATION SIGNS

- A. Includes signs for rooms and area identification, fire extinguishers and fire extinguisher cabinets, unlighted exit signs, room capacity signs, areas of refuge, and elevators and stairs related signs as indicated on Drawings.
1. Photopolymer face fused to phenolic sheet; 0.145 inch total thickness; matte finish.
 2. "Tactile" signage, with copy raised minimum 1/32 inch above sign surface using photopolymer bonded process and with Grade II Braille located below copy.
 3. Clear Window Insertion Slots: As indicated on Drawings.
 4. Copy and graphics to be uniformly opaque.
 5. Copy Font: Helvetica Medium, uppercase.
 6. Copy Height: As indicated on Drawings.
 7. Braille Height: As indicated on Drawings.
 8. Symbol Size: As indicated on Drawings.
 9. Total Thickness: As indicated on Drawings, but not less than 0.145 inch.
 10. Size and Configuration: As indicated on Drawings.
 11. Corners: 1/2 inch radius unless indicated otherwise on Drawings.
 12. Edges: Beveled and smooth.
 13. Graphic Style: International type.
 14. Colors:
 - a. Background: As selected by Architect from submitted samples.
 - b. Copy:
 - 1) As selected by Architect from submitted samples.
 - c. Symbols and Graphics:
 - 1) As selected by Architect from submitted samples.
 15. Room Identification Sign Types:
 - a. Drawings indicate Sign Type Designations, Size, Copy, Symbols, and Insert Window requirements.
 - b. Signs required at all door openings and spaces and as indicated on Drawings.
 - c. Refer to Signage Schedule, Elevations, and Details on Drawings.
 - d. Include twelve (12) additional identification signs with graphics to be determined during construction. Type to be the type with insert window.
 - e. Back Cover Plate: Where sign must be secured to glass, acquire Architect approval prior to fabrication and installation of a Backing Cover (blank solid sign) on the opposite side of the glass. The backing cover material shall match

the size, shape, base color, thickness, and finish of the sign. The intent is to hide the unsightly back view of the sign when viewed on the opposite side of the glass. (Back Cover Plate, also referenced in ACCESSORIES, and INSTALLATION articles in this Section.)

2.4 APPLIED VINYL GRAPHICS

- A. Vinyl film, die-cut characters; 2 inches high, 3 mils thick.
 - 1. Adhesive backing to be pressure-sensitive and exterior application grade type.
- B. Provide door graphics for each of the following:
 - 1. Copy: **VISITORS REPORT TO MAIN OFFICE** (8 signs required)
 - 2. Copy: **TOBACCO FREE PROPERTY** (8 signs required)

2.5 DIMENSIONAL LETTER SIGNS

- A. Exterior Metal Letters: Architectural grade aluminum.
 - 1. Copy Style: Helvetica Medium, unless indicated otherwise on Drawings.
 - 2. Finish: Brushed.
 - 3. Copy and Locations: Characters to be designated by Architect.
 - a. Building Face - Address Identification (AHJ requirement):
 - 1) Copy text, height, and location on building exterior to be as required and designated by the local Fire Marshal and IBC 501.2 code.
 - b. Building Face - Building Name.
 - 1) Location: Mounted on building wall; height and location as follows:
 - a) To be designated by Architect:
 - 2) Character Thickness:
 - a) 1 inch.
 - 3) Characters:
 - a) 35 upper case, 18 inches high. (35 total characters)
 - c. Primary Monumental Site Sign.
 - 1) Location: Mounted on two sides of Primary Monumental Site Sign.
 - a) Character Thickness:
 - (1) 1 inch.
 - b) Characters:
 - (1) 35 upper case, 12 inches high. (70 total characters)
- B. Interior Metal Letters: Architectural grade aluminum.
 - 1. Copy Style: Helvetica Medium, unless indicated otherwise on Drawings.
 - 2. Finish:
 - a. Painted: Manufacturer's standard finish paint system; color to be as selected by Architect from manufacturer's full range.
 - 3. Character Thickness:
 - a. 1 inch.
 - 4. Character Height:
 - a. 8 inches, unless indicated otherwise on Drawings.
 - 5. Copy:
 - a. Copy: **LOBBY** (1 sign required)
 - b. Copy: **GYMNASIUM** (1 sign required)
 - c. Copy: **XXX CLASSROOM WING** (4 signs required; XXX is to be a 3 digit prefix number as determined by Architect)
 - d. Copy: **GIRLS** (1 sign required)
 - e. Copy: **BOYS** (1 sign required)
 - f. Provide 25 additional upper case characters; copy to be provided by Owner.

2.6 WARNING STENCILS

- A. Reusable stencils for painting warning on both sides of rated walls, above hung ceiling.
 - 1. Copy: **X-HOUR RATED WALL - PROTECT ALL OPENINGS** (X is to be the actual numeral that represents the wall fire rated time designation).
 - 2. Letter Color: Red.
 - 3. Letter Size: 3 inches tall.
 - 4. Spacing: Apply at 15 feet o.c. at all rated walls above ceilings on both sides of walls.
 - 5. Quantity: Since stencils are reusable, quantity is determined by Contractor.

2.7 DEDICATION PLAQUE

- A. Dedication Plaque:
 - 1. Material: Cast bronze.
 - 2. Quantity: One.
 - 3. Size:
 - a. 18 x 24 inches.
 - 4. Border:
 - a. Single line type.
 - 5. Finish: Pebble texture, oxidized finish.
 - 6. Letter Finish: Satin polish.
 - 7. Mounting: Standard concealed mounting to comply with the manufacturer's written instructions for type of wall surface indicated.
 - 8. Characters: Style and copy to be selected by Architect and Owner from manufacturer's full range of options.
 - a. Plaque to include the following information:
 - 1) Project Name. To be determined by Architect and Owner.
 - 2) Date of Construction.
 - 3) School System Information:
 - a) Names and Title of all the Board of Education Members.
 - b) Name and Title of the School System Superintendent.
 - 4) Architect's Name and Location.
 - 5) Construction Manager's Name.
 - 6) General Contractor's Name.

2.8 LED SCREEN MARQUEE SIGNS

- A. Provide exterior type sign system; exposed to weather.
 - 1. Manufacturers:
 - a. Daktronic - LED GS6 Series.
 - b. Entech Signs - Alpha LED.
 - c. ThinkSIGN, Inc. - LED Extreme 16 Series.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
 - 2. Basis of Design:
 - a. Entech Signs - Alpha LED: Excite.
 - 3. Viewable Display Screens:
 - a. Two (2) display screens.
 - 4. Location:
 - a. To be installed at front of property, adjacent to public roadway, and location directed by Architect.
 - 5. Design Requirements:
 - a. Sign System Includes:
 - 1) Sign, housing, seals, anchorage, and all components for operational sign system assembly.
 - 2) Pedestal and concrete foundation for free-standing sign systems.

- b. Sign System Design: To be designed and sealed by a licensed Professional Engineer experienced in design of work of this type and licensed in the State in which the project is located. The engineer is to certify that all applicable code requirements have been met. The engineer may be in the employ of the manufacturer of the sign system, provided the Engineer is compliant with the above registration requirement.
 - 1) Design sign system to safely withstand wind loads as indicated on Drawings for the Structural Design Criteria and in compliance with the current State Building Code for the State in which the project is located.
 - 2) Comply with the design requirements on the Drawings regarding sign system size and configuration.
 - 3) Include engineered sign system design in the Shop Drawings submittals.
- 6. LED Digital Sign: Configuration to be as indicated on Drawings and as follows.
 - a. LED Screen Display: Full color.
 - 1) LED Pixel Pitch: 16mm (0.63 inch).
 - 2) LED Pixel Color: 1 Red/1 Green/1 Blue LED per pixel.
 - 3) LED Color: PureColor, 16.7 million colors.
 - 4) Viewability & Intensity: 160 degrees horizontal/60 degrees vertical; 6500 nits.
 - 5) Digital Display Size:
 - a) Height: 30.24 inches (48 pixel rows @ 0.63 inch per row).
 - b) Width: 91.72 inches (144 pixel columns @ 0.63 inch per column).
 - c) Digital Display Matrix: 48 pixels high x 144 pixels wide.
 - b. Video Frame Rate:
 - 1) Video marquee version: 60 fps, functions as a video monitor display.
 - c. Dimming: 10 percent to 100 percent; automatic light sensor.
 - d. Screen Display Case:
 - 1) Material: Mill finish aluminum.
 - 2) Depth: 10.2 inches deep (including metal angle for mounting).
 - 3) IP (ingress protection) Code Rated: IP24 minimum rating in accordance with IEC 60529.
 - 4) UL Listed: UL 50 type 3R.
 - e. Programming Software and Hardware: Provide current version of Ooh!Media Pro Version software, hardware and all wiring connections required for fully operational sign system.
 - f. Controller: Embedded PC, DVI link to the sign monitor.
 - g. Connectivity to Controller: Wired Ethernet with optional wireless and DSL modem (phone company requirement).
 - h. Operating Temperature: -22 degrees to 122 degrees F (-30 degrees to 50 degrees C).
 - i. Service Access: Front-serviceable components. Display drivers (16 x 16) are to be removable without opening the front access door.
 - j. Mounting Components: Stainless steel mounting components and fasteners to be used for anchoring sign system to superstructure and foundation.
 - k. Miscellaneous Fasteners: Stainless steel.
 - l. Agency Approvals: UL 48.
 - m. Special Features Required:
 - 1) Industry standard 1GB compact flash memory for message storage.
 - 2) External temperature probe.
 - 3) DVI monitor capability.
 - 4) Protector Case: Ventless enclosure designed to reflect solar radiation and sealed against intrusion by rain, salt, fog, fumes, and dust.
 - 5) Automatic thermal protection for all electronics.

- 6) Thermostatically controlled fans for each module/case for internal air mixing.
- n. Warranty:
 - 1) Sign System Warranty: Provide manufacturer's five (5) year limited warranty.
 - 2) Programming Software and Hardware Warranty: Provide manufacturer's standard warranty; not less than one (1) year duration.
7. LED Digital Sign Pedestal: Size and configuration to be as indicated on Drawings.
 - a. Superstructure: Hot dipped galvanized steel members sized and joined per the required engineer's design.
 - b. Sheet Metal: Pre-finished aluminum; ASTM B209/209M, 3003 or 3005 alloy, H12 or H14 temper.
 - 1) Thickness: Base metal thickness unless indicated otherwise on Drawings or required engineer's design.
 - a) 14 gauge, (0.064 inch) (1.63 mm) minimum.
 - 2) Superior Performance Organic Coating System: AAMA 2605, shop applied multiple coats, thermally cured polyvinylidene fluoride (PVDF) resin system.
 - a) Three-Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in each color coat and clear topcoat. Prepare, pre-treat, and apply coatings.
 - b) Color: As selected by Architect from full range of options.
 - 3) Sheet Metal Joinery: Joined and sealed to provide weathertight enclosure. Sealant to match metal finish.
 - 4) Fasteners and anchors to be stainless steel and unexposed except for service access.

2.9 ACCESSORIES

- A. Mounting Hardware: Screws; stainless steel; countersunk Phillips flat head screws.
- B. Tape Adhesive: Double sided foam tape; permanent adhesive.
- C. Back Cover Plate: Where sign must be secured to glass, acquire Architect approval prior to fabrication and installation of a Backing Cover (blank solid sign) on the opposite side of the glass. The backing cover material shall match the size, shape, base color, thickness, and finish of the sign. The intent is to hide the unsightly back view of the sign when viewed on the opposite side of the glass. (Back Cover Plate, also referenced in ROOM IDENTIFICATION SIGNS and INSTALLATION articles in this Section.)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate if finished to include finish coating(s).
- C. Verify adequate blocking and supports to structure are installed and ready to receive work.
- D. Verify that electrical and communications wiring requirements are provided for connectivity.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.

- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work at locations indicated on Drawings. Install signs level and plumb unless indicated otherwise.
- C. Room Identification Signs: Mount with double sided foam tape and countersunk phillips flat head screws. Screw head is to finish flush with sign surface. Finish of screw heads is to match the color and finish of the portion of the sign that the screw is seated into.
 - 1. Position of Room Identification Signs:
 - a. Signage mounting heights must conform to ADA accessibility requirements including the height of Braille notations. Mount center of sign 9 inches from strike side of door and top of sign at 60 inches from floor.
 - 2. Where sign must be secured to glass, acquire Architect approval prior to fabrication and installation of a Backing Cover (blank solid sign) on the opposite side of the glass. The backing cover material shall match the size, shape, base color, thickness, and finish of the sign. The intent is to hide the unsightly back view of the sign when viewed on the opposite side of the glass. (Back Cover Plate, also referenced in ROOM IDENTIFICATION SIGNS and ACCESSORIES articles in this Section.)
- D. Applied Vinyl Graphics: Mount on exterior of glass doors.
- E. Dimensional Letter Signs: Mount with stainless steel threaded rods into expansion shields. All hardware shall be stainless steel.
- F. Mount fire protection system signage in accordance with International Fire Code requirements.
- G. Dedication Plaque: Mount with stainless steel threaded rods into expansion shields.
- H. LED Marquee Sign: Construct and install sign system, including programming software and hardware, in compliance with the engineer's design, manufacturer's recommendations and the Drawings.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.

3.6 DEMONSTRATION AND TRAINING

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.
- B. LED Screen Marquee Sign:
 - 1. Demonstrate programming and operation of signage to Owner.

END OF SECTION

SECTION 10 21 13.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL**1.1 SUMMARY**

- A. Section includes solid plastic toilet compartments and urinal screens.
- B. Related Requirements:
 - 1. Section 10 28 13 - Toilet Accessories.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
 - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- B. International Code Council (ICC).
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with placement of support framing and anchors in wall.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plans, door swings, elevation views, dimensions, details of wall and floor supports.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes and colors available. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Include special procedures and perimeter conditions requiring special attention.

PART 2 PRODUCTS**2.1 PERFORMANCE REQUIREMENTS:**

- A. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E84:

1. Class A: 25 maximum flame spread index; 450 maximum smoke developed index.
- B. Material Fire Ratings:
1. NFPA 286: Pass.
 2. International Code Council (ICC): Class B.

2.2 SOLID PLASTIC TOILET COMPARTMENTS

- A. Manufacturers:
1. All American Metal Corp - AAMCO.
 2. ASI Accurate Partitions.
 3. Metpar Corporation.
 4. Partition Systems International of South Carolina (PSiSC).
 5. Scranton Products.
 6. Substitutions: Section 01 60 00 - Product Requirements.

2.3 COMPONENTS

- A. Toilet Compartments: Solid, molded thermoset, and waterproof; high-density polyethylene (HDPE) plastic panels, doors, and pilasters. Dimensions to be as indicated unless indicated otherwise on Drawings.
1. Panels:
 - a. Thickness: 1 inch.
 - b. Width: As indicated on Drawings.
 - c. Height:
 - 1) As indicated on Drawings.
 2. Doors:
 - a. Thickness: 1 inch.
 - b. Width: Opening clearance as follows unless indicated otherwise on Drawings.
 - 1) Accessible (H/C) Compartment Doors: Out-swinging with opening clearance complying with ADA standards.
 - 2) Standard Compartment Doors: 28 inches.
 - c. Height:
 - 1) Match compartment panels.
 3. Urinal Screens:
 - a. Thickness: 1 inch.
 - b. Width: Total projection from wall to be 23 inches. Dimension includes pilaster assembly where pilaster is indicated on Drawings.
 - c. Height:
 - 1) As indicated on Drawings.
 4. Pilasters:
 - a. Thickness: 1 inch.
 - b. Widths: As required to fit space and not less than 3 inches.
 - c. Height:
 - 1) As indicated on Drawings.
 5. Color:
 - a. As selected by Architect from manufacturer's full range.

2.4 ACCESSORIES

- A. All finish metal components and accessories to be as follows, unless otherwise indicated:
1. Satin Finish.
- B. Pilaster Shoe: Formed ASTM A666 Type 304 stainless steel, 3 inches high, concealing floor mounting and adjustment hardware. Provide adjustment for floor variations with screw jack

- through steel saddles integral with pilaster. All metal mounting and adjustment hardware to be stainless steel.
- C. Head Rails: Extruded aluminum tube, color clear anodized 1 x 1-5/8 inch size, with anti-grip profiles and cast socket wall brackets. Maximum lengths practical. Head Rails to extend to wall and be anchored securely to wall frame blocking.
 - D. Vertical Brackets: Double flange type.
 - 1. Extruded aluminum; color clear anodized.
 - a. Continuous length.
 - E. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 - 1. Attaching panels and pilasters to brackets: Binding Post through-bolts and nuts.
 - 2. Attaching hardware: Binding Post through-bolts and nuts; tamper proof.
 - F. Hardware:
 - 1. Material:
 - a. Stainless steel.
 - 2. Hinges:
 - a. Continuous hinges, self-closing.
 - 3. Door Latch: Slide type with exterior emergency access feature.
 - 4. Door Strike and Keeper: Include rubber bumper; mounted on pilaster in alignment with door latch.
 - 5. Door Stop: Provide door stop for each door, mounted on door face to prevent door assembly from hitting wall or other finishes. Door stop design to be coat hook type, rubber tip, four (4) screw mounting base, and finish to match other door hardware.
 - 6. Door Pulls: Provide ADA compliant door pull on each side of door for out-swinging doors.
 - 7. Provide metal heat sink at bottom of doors and partitions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify field measurements are as indicated.
- C. Verify correct spacing of and between plumbing fixtures.
- D. Verify correct location and adequate support of built-in framing, anchorage, and bracing.

3.2 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work level and plumb.
- C. Attach panel brackets securely to support framing and anchor points using anchor devices.
- D. Attach panels and pilasters to brackets.
- E. Locate head rail joints at pilaster center lines.
- F. Adjust pilaster shoe leveling screws to produce level and plumb panel construction on sloped floors.

3.3 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.

- B. Maximum Variation from Indicated Position: 1/4 inch.
- C. Maximum Variation from Plumb: 1/8 inch.

3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Adjusting.
- B. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- C. Adjust hinges to position in-swinging doors in partial open position (about 3 inches open) when unlatched. Return out-swinging doors to closed position.
- D. Adjust adjacent components for consistency of line or plane.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.

END OF SECTION

SECTION 10 26 23.14

WALL PROTECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall Corner Guards.

1.2 REFERENCE STANDARDS

- A. ASTM International (ASTM):
 - 1. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2023, Editorial Revision 2023.
 - 2. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
 - 4. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Revision 2021.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate installation of appropriate strength concealed blocking with the anchoring requirements for attaching the work of this Section to substrate.
- C. Coordinate installation of wall coating and wall cover finishes to be complete prior to installation of the work of this Section.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on unit construction, sizes, configuration, jointing methods and locations when applicable, and attachment method.
- C. Shop Drawings: Submit shop drawings including profiles, elevations, locations, attachment to substrate, and accessories.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Indicate special installation criteria and interface with adjacent components.

1.5 QUALITY ASSURANCE

- A. Provide protection systems of each type from a single source and manufacturer.

1.6 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with minimum seven (7) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section and with minimum five (5) years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with the following unless otherwise indicated:
 - 1. Impact Strength: Applicable provisions of ASTM D256.
 - 2. Lateral Impact: Resists lateral impact force of 100 lbs (445 N) at any point without damage or permanent set.
 - 3. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - 4. Chemical and Stain Resistance: Applicable provisions of ASTM D543.
 - 5. Fungal Resistance: Passes ASTM G21 testing.

2.2 WALL CORNER GUARDS

- A. Non-Metal Wall Corner Guards.
 - 1. Manufacturers:
 - a. Construction Specialties, Inc.
 - b. Inpro.
 - c. Koroseal Interior Products.
 - d. Wallprotex.
 - e. Substitutions: Section 01 60 00 - Product Requirements.
 - 2. Corner Guard Material:
 - a. Polyethylene terephthalate (PET or PETG): PVC-free and high impact type.
 - 3. Attachment:
 - a. Retainer Bracket: Full height of guard; anchored with non-corrosive screws.
 - 1) Extruded aluminum.
 - 4. End Caps: Factory premolded and finished to match corner guard.
 - 5. Lengths: One piece.
 - a. 4 feet.
 - 6. Width of Wings:
 - a. 2 inches.
 - 7. Corners:
 - a. 1/8 inch radius.
 - 8. Finish and Color:
 - a. As selected by Architect from manufacturer's full range.
 - 9. Application Locations:
 - a. As indicated on Drawings.

2.3 ACCESSORIES

- A. Accessories are to be appropriate to component, substrate and as indicated in this Section.
 - 1. Mounting Brackets and Attachment Hardware: As recommended by manufacturer.

2.4 FABRICATION

- A. Fabricate components free of visual distortion and free of defects.
- B. Fabricate components with tight joints, corners, and seams.
- C. Pre-drill holes for attachment.
- D. End closures are to be factory fabricated to match components.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- C. Verify that field measurements are as required.
- D. Verify that surfaces and conditions are ready to accept the Work of this Section.
- E. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the Work in compliance with the design requirements, applicable codes, manufacturer's recommendations, and the Contract Documents.
- C. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- D. Position bottom of corner guards 4 inches above finished floor unless indicated otherwise.

3.4 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From Required Height: 1/4 inch (6 mm).

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed Work in accordance with manufacturer's recommendations including cleaning procedures and materials.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage and unauthorized tampering.

END OF SECTION

SECTION 10 28 00
TOILET ACCESSORIES

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Toilet room accessories.
 - 2. Shower accessories.
 - 3. Utility room accessories.
- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry.
 - 2. Section 06 10 53 - Miscellaneous Rough Carpentry: Blocking in framed walls.
 - 3. Division 09 - Finishes: Sections describing wall materials and finishes.
 - 4. Division 10 - Specialties: Sections describing Toilet Compartments.
 - 5. Division 26 - Electrical: Construction related to electric devices.

1.2 REFERENCES

- A. Americans with Disabilities Act (ADA):
 - 1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; current edition.
- B. ASTM International (ASTM):
 - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
 - 2. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service, 2022.
 - 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
 - 4. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar, 2023.
 - 5. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2023.
 - 6. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017, Reapproval 2022.
 - 7. ASTM C1036 - Standard Specification for Flat Glass; 2021.
 - 8. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
 - 9. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2024.
 - 10. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2022.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.
- C. Coordinate electrical requirements with electrical service construction.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods.
- C. Manufacturer's Installation Instructions: Submit special procedures, conditions requiring special attention.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide products of same manufacturer unless otherwise acceptable to Architect.
 - 1. Exception: Products whose Basis of Design manufacturer differs from majority of other indicated products.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. All devices to be compliant with applicable codes and ADA standards.
- B. Manufactured and 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.
- C. Design grab bars, attachments, anchors and provide blocking to resist minimum 250 lbs concentrated load applied at any point in any direction.
- D. Keys: Furnish two (2) keys for each accessory to Owner; master key lockable accessories.

2.2 TOILET AND BATH ACCESSORIES

- A. Manufacturers:
 - 1. American Specialties, Inc. (ASI).
 - 2. Bobrick Washroom Accessories.
 - 3. Bradley Corporation.
 - 4. Electric Hand Dryers:
 - a. Bobrick Washroom Accessories.
 - b. Dyson.
 - c. Excel Dryer, Inc.
 - d. Pinnacle Dryer Corporation.
 - 5. Substitutions: Section 01 60 00 - Product Requirements.

2.3 MATERIALS

- A. Stainless Steel Sheet: ASTM A666, Type 304.
- B. Stainless Steel Tubing: ASTM A269/A269M, Grade T316.
- C. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- D. Zinc Alloy: Die cast, ASTM B86.
- E. Mirror Glass:
 - 1. Fully tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

- F. Adhesive: Two component epoxy type, waterproof.
- G. Fasteners, Screws, and Bolts: Stainless steel, ASTM F593; tamper-proof, security type.
- H. Expansion Shields: Fiber, lead, stainless steel, or rubber as recommended by accessory manufacturer for component and substrate.

2.4 TOILET ROOM ACCESSORIES

- A. Toilet Tissue Dispenser (TD): Open roll type with both rolls accessible.
 - 1. Double Roll Type: Surface mounted bracket, satin finished cast aluminum brackets.
 - a. Controlled Delivery Type: To be in all stalls and toilets except ADA accessible stalls and toilets. Eccentric-shaped plastic spindles for 1/2 revolution delivery, designed to prevent theft of tissue roll.
 - 1) Basis of Design:
 - a) [Bobrick B-274](#) (surface mounted).
 - b. Non-Controlled Delivery Type: To be in all ADA accessible stalls and toilets. Eccentric-shaped plastic spindles, designed to prevent theft of tissue roll.
 - 1) Basis of Design:
 - a) [Bobrick B-2740](#) (surface mounted).
- B. Paper Towel Dispenser (PTD):
 - 1. In addition to locations indicated on Drawings, provide PTD at all sinks where PTD or EHD is not indicated.
 - 2. Folded paper type, stainless steel, hinged door with tumbler lock, minimum capacity of 350 C-fold towels.
 - a. Basis of Design:
 - 1) [Bobrick B-262](#) (surface mounted, view slot).
- C. Soap Dispenser (SD):
 - 1. In addition to locations indicated on Drawings, provide SD at all sinks where SD is not indicated.
 - 2. Liquid soap dispenser; stainless steel body, back, lid and working parts; lid hinged and special key access; push type soap valve; window gage refill indicator; 40 ounces minimum capacity.
 - a. Basis of Design:
 - 1) [Bobrick B-4112](#) (surface mounted, horizontal tank).
- D. Framed Mirrors (MIR):
 - 1. Mirror Glass: 1/4 inch thick tempered mirror glass; ASTM C1048, abrasion-resistant coated mirror.
 - 2. Frame: Stainless steel; 3/4 inch angle shapes (0.05 inch thick); mitered and welded and ground corners; satin finish; tamperproof hanging system.
 - 3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and non-absorptive filler material.
 - 4. Size and Configuration: As indicated on Drawings.
 - 5. Basis of Design:
 - a. [Bobrick B-2908 Series](#).
- E. Framed Mirrors (MIR1): ADA fixed tilted mirror.
 - 1. Mirror Glass: 1/4 inch thick tempered mirror glass; ASTM C1048, abrasion-resistant coated mirror.
 - 2. Frame: Stainless steel; 0.0375 inch (20 gauge) minimum thickness; fully welded joints and corners, ground smooth; 20 gauge stainless steel stiffeners added for rigidity; satin finish; tamperproof hanging system.
 - 3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and non-absorptive filler material.

4. Size, Angle and Configuration: As indicated on Drawings.
 5. Basis of Design - Fixed Tilted Mirror:
 - a. [Bobrick B-293](#) Series: Fixed-Tilt, ADA, 24 x 36 inches, unless indicated otherwise on Drawings.
- F. Grab Bars (GB):
1. Stainless steel, 1-1/2 or 1-1/4 inch outside diameter, minimum 0.05 inch (18 gauge) wall thickness, safety grip peened grasping surface finish; concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
 2. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
 3. Length and Configuration: As indicated on Drawings.
 4. Basis of Design:
 - a. [Bobrick B-6806.99](#) (1-1/2 O.D.).
- G. Sanitary Napkin Disposal Unit (SND):
1. Stainless steel; self-closing door; locking bottom panel with full-length stainless steel piano-type hinge and removable receptacle.
 2. For thru-partition, 2 side access units, coordinate fit with toilet partition thickness.
 3. Basis of Design:
 - a. [Bobrick B-254](#) (surface mounted).
 - b. [Bobrick B-353](#) (recess mounted).
 - c. [Bobrick B-354](#) (thru-partition, 2 sides).
- H. Electric Hand Dryers (EHD): Coordinate electrical requirements.
1. Operation: Automatic sensor-operated on and off.
 2. Air Nozzle: Fixed downward direction with stainless steel wall splash guard below.
 3. Basis of Design:
 - a. ADA Compliant - Surface Mount:
 - 1) [Pinnacle P3-12S](#) - Stainless steel case; Heated air.
- I. Baby Changing Table (BCT):
1. Basis of Design:
 - a. [Bradley 963](#) Series: Plastic; color as selected by Architect (surface mounted).
- J. Coat Hook (CH): Solid aluminum casting, matte finish; rubber bumper protects wall and partition surfaces; 4 screws attachment base.
1. Provide coat hook centered on each toilet compartment door, inside compartment.
 - a. Secure coat hooks with machine screws from hook side and pan head sleeve nuts (hex socket) from opposite end for thru-bolt assembly.
 2. Provide coat hooks in locations indicated on Drawings.
 3. Basis of Design:
 - a. [Bobrick B-212](#).

2.5 SHOWER ACCESSORIES

- A. Grab Bars (GB):
1. Stainless steel, 1-1/2 or 1-1/4 inch outside diameter, minimum 0.05 inch (18 gauge) wall thickness, safety grip peened grasping surface finish; concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
 2. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
 3. Length and Configuration: As indicated on Drawings.
 4. Basis of Design:
 - a. [Bobrick B-6861.99](#) (1-1/2 O.D.) (Shower).
- B. Shower Curtain Rod (SCR): Stainless steel tube, extra heavy duty; 1-1/4 inch outside diameter, 0.05 inch (18 gauge) wall thickness, satin-finished, with satin-finished stainless steel flanges, for concealed mounting.

1. Include shower curtain for each rod; opaque vinyl, 0.008 inch thick minimum, matte finish, with antibacterial treatment; flameproof and stain-resistant; 6 inches wider than rod length.
 2. Include shower curtain hooks with each shower rod and curtain; stainless steel Type 304 wire, pear-shaped; sized to fit curtain rod diameter.
 3. Basis of Design:
 - a. [Bobrick B-6047 Series](#) (curtain rod).
 - b. [Bobrick 204 Series](#) (curtain).
 - c. [Bobrick 204-1](#) (curtain hooks).
- C. Robe Hook (RH): Stainless steel; single prong; rectangular-shaped hook; satin finish; concealed mounting with vandal resistant escutcheon.
1. Provide one (1) per each shower; locate outside stall on wall 16 inches from stall.
 2. Basis of Design:
 - a. [Bobrick B-76717](#).
- D. Towel Bar (TB): Heavy duty stainless steel Type 304, 0.05 inch (18 gauge) thick, 1 inch round tubular bar; exposed or concealed attachment, satin finish.
1. Length: 24 inches.
 2. Basis of Design:
 - a. [Bobrick B-530](#).
- E. Wall-Mounted Soap Dish (WSD): Heavy duty, one-piece stainless steel, dish with two ridges and drain holes; surface-mounted; satin finish; concealed mechanical fastening suitable for substrate.
1. Basis of Design:
 - a. [Bobrick B-6807](#).
- F. Shower Seat (SS): Folding type; surface wall-mounted; welded tubular seat frame, structural support members, hinges and mechanical fasteners of Type 304 stainless steel, rectangular seat; supports 500 lbs, minimum.
1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of color as selected by Architect.
 2. Basis of Design:
 - a. [Bobrick B-5191](#).

2.6 UTILITY ROOM ACCESSORIES

- A. Mop and Broom Holder (MH): 0.05 inch thick (18 gage), Type 304 stainless steel.
1. Mop Holders: Four (4) spring-loaded rubber cam holders, holds mops 8 inches from wall.
 2. Shelf: 18 gage, 8 inches deep.
 3. Rag Hooks: One each, midway between mop holders.
 4. Length: 36 inches.
 5. Basis of Design:
 - a. [Bobrick B-224 x 36](#).
- B. Mop Sink Wall Splash Guard: 16 gage, Type 304 Stainless steel.
1. Provide wall guard at each mop sink in project.
 2. Wall guard height to span from mop sink top rim to 8 inches above water supply pipe wall penetrations, and not less than 36 inches above mop sink top rim.
 3. Fabrication: Custom fit to wall configuration; one piece fabrication; configured to protect all wall surfaces adjacent to mop sink rim; all edges to be single hemmed; corners to be ground smooth.
 4. Fasteners: Stainless steel, low profile pan head screws with EPDM bonded seal washer.

5. Installation: Ensure that mop sink rim has been fully sealed to wall prior to installation of wall guard. At frame walls, ensure that adequate blocking is behind wall finish to engage with fasteners. Bottom of wall guard to be 1/8 inch above mop sink rim (allowing gap for application of sealant bead). After attaching wall guard to wall, apply sealant around entire perimeter of wall guard.

2.7 FACTORY FINISHING

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.
- B. Chrome/Nickel Plating: ASTM B456, Type 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.
- D. Powder-Coated Steel: Clean, degrease, and neutralize. Follow immediately with a phosphatizing treatment, prime coat, and two finish coats of powder coat enamel.
- E. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanized ferrous metal and fastening devices; minimum 1.2 oz/sq ft coating thickness; galvanized after fabrication.
- F. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- G. Back paint components where contact is made with building finishes to prevent electrolysis.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that internal wall reinforcement and reinforcement of toilet partitions, to receive anchor attachments, is installed and adequate to attach the work securely.
- D. Coordinate electrical requirements with electrical service construction.
- E. Verify field measurements are as indicated on product data instructed by manufacturer.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Deliver inserts and rough-in frames to site for timely installation.
- D. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on Drawings.

3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust and test installed Work for proper functionality.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean installed Work and comply with manufacturer's recommendations.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed Work from damage.

END OF SECTION

SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes:
 - 1. Fire extinguishers.
 - 2. Fire extinguisher cabinets.
 - 3. Accessories.
- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry: Walls for mounting equipment.
 - 2. Section 09 21 16 - Gypsum Board Assemblies: Walls for mounting equipment.

1.2 REFERENCE STANDARDS

- A. ASTM International (ASTM):
 - 1. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- B. Factory Mutual (FM):
 - 1. FM (AG) - FM Approval Guide; Current Edition.
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- D. Underwriters Laboratories Inc. (UL):
 - 1. UL (DIR) - Online Certification Directory; Current Edition.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
 - 1. Submit extinguisher operational features, full range of colors and finishes, and anchorage details.
 - 2. Submit cabinet product data, operational features, full range of colors and finishes, and anchorage details.
- C. Shop Drawings:
 - 1. Indicate mounting measurements for brackets, locations, and fire ratings.
 - 2. Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, installation measurements for cabinets. Locations, and fire ratings.
- D. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Submit test, refill or recharge schedules and recertification requirements.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install extinguishers when ambient temperature is capable of freezing extinguisher ingredients.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. Manufacturers:
 - 1. Activar Construction Products Group Inc. - JL Industries.
 - 2. Ansul, a Tyco Business.
 - 3. Kidde, a unit of United Technologies Corporation.
 - 4. Nystrom, Inc.
 - 5. Potter-Roemer.
 - 6. Pyro-Chem, a Tyco Business.
 - 7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Activar Construction Products Group Inc. - JL Industries.
- C. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- D. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: A:B:C type.
 - 2. Size: 10 pounds.
 - 3. Finish: Baked polyester powder coat, red color.
 - 4. Temperature range: Minus 40 degrees F to 120 degrees F.
- E. Wet Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gauge.
 - 1. Class: K type.
 - 2. Size: 1.8 gallons.
 - 3. Finish: Polished stainless steel.
 - 4. Temperature range: Minus 20 degrees F to 120 degrees F.

2.2 FIRE EXTINGUISHER CABINETS

- A. Manufacturers:
 - 1. Activar Construction Products Group, Inc. - JL Industries.
 - 2. Kidde, a unit of United Technologies Corp.
 - 3. Larsen's Manufacturing Company.
 - 4. Nystrom Inc.
 - 5. Potter-Roemer.
 - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Activar - JL Industries - Academy Series.
- C. Fire Extinguishers Cabinets: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.

2. Provide fire extinguisher cabinets classified and labeled by UL for purpose specified and indicated.
- D. Non-Fire Rated Cabinet Construction:
 1. Formed aluminum; 0.036 inch thick base metal.
- E. Fire Rated Cabinet Construction: Fire rating to be as required by rating of wall construction.
 1. Steel; double wall or outer and inner boxes with minimum 5/8 inch thick fire barrier material.
- F. Cabinet Trim and Installation Configuration:
 1. Semi-Recessed Trim Type:
 - a. 2-1/2 inch projection from wall surface; rolled edge; 1-3/4 inch face width.
- G. Cabinet Tub Size: Provide tube size as needed to accommodate required extinguisher and accessories content.
- H. Door: Minimum 0.036 inch thick base metal formed to 5/8 inch thickness, reinforced for flatness and rigidity with nylon catch. Continuous hinge door for 180 degrees opening. Pull to be surfaced mounted handle type with two through-door bolts.
 1. Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.
 - a. Full door glazed panel.
 2. Signage:
 - a. Die cut vinyl letters, self adhering; uppercase Helvetica font; vertical descending composition.
 - 1) Application:
 - a) Reverse adhered on inside face of door glazing panel.
 - 2) Letters color to be as selected by Architect from full range of options.
- I. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors; no visible fasteners on exterior of cabinet.
- J. Weld, fill, and grind joinery and components smooth.
- K. Finishes:
 1. Non-Fire Rated Cabinets:
 - a. Cabinet Exterior Trim and Door Finish:
 - 1) Aluminum Construction: Clear anodized finish.
 - b. Cabinet Tub Finish: Match exterior material and finish.
 2. Fire Rated Cabinets:
 - a. Cabinet Exterior Trim, Door, and Tub Finish:
 - 1) Steel Construction: Powder coat finish; color as selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

- A. Extinguisher Brackets:
 1. Formed stainless steel, satin finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify locations and mounting heights for each unit.
- C. Verify rough openings for cabinets are correctly sized and located.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install cabinets plumb and level in wall openings and as indicated on Drawings.
- C. Install wall brackets at location indicated on Drawings.
- D. Secure rigidly in place.
- E. Install extinguishers and accessories in cabinets or on wall brackets as indicated on Drawings.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

3.6 SCHEDULES

- A. Fire Extinguisher Cabinet Locations: As indicated on Drawings.
 - 1. In fire rated construction, provide fire rated cabinets in compliance with the requirements for the fire rated construction.
- B. Fire Extinguisher Locations by Type:
 - 1. Type K and Type A:B:C fire extinguishers:
 - a. Kitchens (bracket installed if no cabinet indicated).
 - 2. Type A:B:C fire extinguishers:
 - a. All locations not indicated to be other Type. Areas include, but are not limited to the following:
 - 1) Corridors.
 - 2) Assembly Areas.
 - 3) Work Areas.
 - 4) Mechanical Rooms (bracket installed if no cabinet indicated).
 - 5) Electrical Rooms (bracket installed if no cabinet indicated).
 - 6) Elevator Equipment Rooms (bracket installed if no cabinet indicated).
 - 7) Lawn Equipment Sheds (bracket installed if no cabinet indicated).
- C. Fire Extinguisher Quantities by Type:
 - 1. Type K: Zero (0) each.
 - 2. Type A:B:C: Three (3) each.

END OF SECTION

SECTION 10 56 13
METAL STORAGE SHELVING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal storage shelving units.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for all components.
- C. Shop Drawings: Indicate shelving unit components, assembly, anchorage, elevations, dimensions, and room plan layout for each location. Include schedule list indicating room locations and quantity of shelving units.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Indicate special precautions for installation.

1.3 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept components on site in manufacturer's original packaging. Inspect for damage.

PART 2 PRODUCTS

2.1 METAL STORAGE SHELVING

- A. Manufacturers:
 - 1. Lyon Workspace Products.
 - 2. Penco Products.
 - 3. Spacesaver.
 - 4. Tensco Corp.
 - 5. Substitutions: Section 01 60 00 - Product Requirements.

- B. Metal Storage Shelving: Factory-formed, field-assembled, freestanding, upright metal storage shelving system; designed for shelves to span between and be supported by corner posts, with shelves adjustable over the entire height of shelving unit. Shelving units to be engineered to safely support cumulative loaded shelf loads indicated.
- C. Components:
 - 1. Posts: Tubular, L-shaped, and T-shaped, cold-rolled steel, minimum 16 gauge thick, punched on 1-1/2 inch centers. Engineered to safely support loads indicated.
 - 2. Shelves: Box formed edges, minimum 20 gauge thick steel. Engineered to support the following loads:
 - a. Minimum 800 lbs for shelf size of 36W x 18D inches or 36W x 24D inches.
 - b. Minimum 550 lbs for shelf size of 48W x 18D inches or 48W x 24D inches.
- D. Accessories:
 - 1. Shelf Clips: Hot-rolled steel, 12 gauge thick, one-piece construction.
 - 2. Sides and Backs:
 - a. Solid steel panels; 24 gauge thick steel.
- E. Fabrication:
 - 1. Fabricate shelves with turned down box edges with return flange spot welded to bottom of shelf.
 - 2. Fabricate shelves 48 inches long by 24 inches deep, unless indicated otherwise on Drawings.
 - 3. Overall Unit Height: Shelves placed equidistant unless Drawings indicate otherwise.
 - a. 84 inches (5 shelves).
- F. Finish: All metal assemblies and components to be factory powder coated.
 - 1. Colors:
 - a. As selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and methods of attachment with other Work.
- C. Verify spaces are ready to receive Work of this Section.

3.2 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install components according to manufacturer's written instructions, using fasteners appropriate to substrate indicated and recommended by manufacturer.
- C. Install units level, plumb, and firmly anchored.
- D. Anchor units to back wall to prevent tip-over.

3.3 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Replace damaged or defective components.
- C. Remove temporary labels and protective coatings.

- D. Clean exposed surfaces.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect shelving from damage.

END OF SECTION

SECTION 10 73 16**CANOPIES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Factory finished metal canopies suspended from building structure.
- B. Related Requirements:
 - 1. Section 10 73 26 - Walkway Coverings: Walkway coverings supported by columns.
 - 2. Division 05 - Metals: Sections related to structural steel for supporting structure.
 - 3. Division 08 - Openings: Sections related to framed opening infill.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
 - 2. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2020, with Errata 2022.
 - 3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
 - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
 - 5. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
 - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
 - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- D. American Welding Society, Inc. (AWS):
 - 1. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata 2020.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate base components and requirements for attachment and anchorage to structure.
- C. Coordinate work of other Sections that interface and are related to the work of this Section (drainage, sidewalks, building openings, exterior walls, roofing, soffits, fascia, lighting, etc.).

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Manufacturer's product information, specifications and installation instructions for components and accessories.
- C. Shop Drawings: Indicate system and component profiles, sizes, connection attachments, anchorage, size, and type of fasteners; anticipated deflection under load; affected related work; expansion and contraction joint locations and details; drainage details and flow diagrams; field welding; and accessories.
 - 1. Prepare shop drawings indicating attachment system, framing, transverse cross sections, covering and trim details, and installation details to clearly indicate proper assembly of components.
 - 2. Shop drawings and engineering data indicating compliance with requirements of this Section are to be designed and sealed by a licensed professional Engineer. Include test results of previous testing meeting performance criteria, and other supportive data.
- D. Engineering Certification: Submit written certification prepared and signed by a licensed professional Engineer indicating compliance with applicable codes and Performance Requirements indicated in this Section.
- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Design of canopy systems included in this Section are to be designed and sealed by a licensed Professional Engineer, experienced in design of work of this type and licensed in the State in which the Project is located. Engineer is to certify that all applicable code requirements have been met. Engineer may be in the employ of the manufacturer of the covering systems, provided Engineer is compliant with the above registration requirement.
- B. Comply with the current provisions of the following unless otherwise indicated:
 - 1. Applicable codes and authorities having jurisdiction (AHJ).
 - 2. AWS (American Welding Society) standards for structural welding.
- C. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- D. Installer Qualifications: Company specializing in performing the work specified in this Section with minimum five (5) years documented experience.
- E. Single Source Requirement: If project includes Section 10 73 16 - Canopies and Section 10 73 26 - Walkway Coverings, manufacturer to be same and installer to be same for both Sections.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Comply with AAMA CW-10.
- C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Provide for adequate ventilation through wrappings.

1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide five (5) year manufacturer's warranty for finish.
- C. Provide manufacturer's standard one (1) year warranty that includes, but is not limited to, coverage for structural performance, water tightness and finish.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Design system and size components, and anchorage to safely withstand Live Loads, Snow Loads, Wind Loads (+ and -), and Seismic Loads as indicated on Drawings for the Structural Design Criteria and in compliance with ASCE 7 and the State Building Code for the State in which the project is located.
- B. System to provide for expansion and contraction within system components caused by a cycling temperature range of 120 degrees F without causing detrimental effects to system or components.
- C. System to accommodate, without damage to system or components, movement within system, movement between system and perimeter framing components, dynamic loading and release of loads, and deflection of structural support framing.
- D. Conform to applicable code for fire resistance ratings for items.

2.2 MANUFACTURERS

- A. Manufacturers:
 - 1. AVAdek, Inc.
 - 2. Dittmer Architectural Aluminum.
 - 3. Mitchell Metals.
 - 4. Mapes Architectural Products.
 - 5. Peachtree Protective Covers.
 - 6. Perfection Architectural Systems, Inc.
 - 7. Tennessee Valley Metals, Inc., East Coast TVM.
 - 8. Substitutions: Section 01 60 00 - Product Requirements.

2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T6 temper typical; 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M; 6061 alloy, T6 temper.
- C. Fasteners:
 - 1. Deck Screws (rivets not permitted): Type 18-8 non-magnetic stainless steel sealed with a neoprene "O" ring beneath 5/8 inch outside dimension, conical washer.
 - 2. Rivets: Size 3/16 x 1/2 inch grip range aluminum rivets with aluminum mandrel.
 - 3. Bolts: All bolts, nuts, and washers to be 18-8 non-magnetic stainless steel.
 - 4. Tek Screws: Not permitted.

2.4 COMPONENTS

- A. Decking: Extruded self-flashing aluminum sections; interlocking into a watertight composite unit. Extrusion thickness to be a required to withstand imposed loads.

- B. Soffit Type: Flush bottom, unless indicated otherwise on Drawings.
- C. Fascia: Extruded aluminum.
 - 1. For integral fascia and structural frame extrusion, 0.125 inch thick, minimum.
 - 2. For separate fascia extrusion secured to structural frame, 0.050 inch thick, minimum.
 - 3. Shape and size to be as indicated on Drawings.
- D. Flashing: Extruded aluminum, 0.040 inch thick; same finish as for system components; secured with concealed fastening method.

2.5 FABRICATION

- A. Field Measurements: Verify actual supporting and adjoining construction by field measurements before fabrication; and indicate recorded measurements on final Shop Drawings. Verify that supporting construction is as required for support of the Sun Control Devices. Coordinate construction to ensure that sun control assemblies fit properly to supporting and adjoining construction and coordinate schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, coordinate related construction to ensure that Sun Control Devices correspond to established dimensions and construction.
- B. Fabricate assemblies to comply with design as indicated on Drawings.
- C. Fit and shop assemble components in largest practical sizes, for delivery to site.
- D. Fabricate components with joints tightly fitted and secured. Provide allowance for expansion and contraction of entire system.
- E. Provide drainage pathway without leaks and to point of drainage discharge.
- F. For canopies suspended from building (and without columns for drainage), provide for drainage openings with water diverters along bottom of canopy outer edge member. Drainage openings to be as indicated on Drawings. If drainage openings are not indicated on Drawings, locate drainage openings away from building face and not in direct line of door openings.
- G. Arrange fasteners, attachments and jointing to ensure concealment from view.
- H. Supply components required for anchorage of framing. Fabricate anchors and related components of same material and finish as framing, except where specifically noted otherwise.
- I. Continuously seal joined pieces by continuous welds.
- J. Welding In accordance with ANSI/AWS D1.2/D1.2M.
- K. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, hairline, and waterproof. Ease exposed edges to small uniform radius.
- L. Accurately form components to suit each other and to building structure.
- M. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at not less than 18 inches 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.

2.6 ACCESSORIES

- A. Fittings: Elbows, T-shapes, wall brackets; cast aluminum.

- B. Splice Connectors: Concealed spigot; cast aluminum.
- C. Struts: Manufacturer's standard rod type and material.
- D. Wall Brackets: Manufacturer's standard decorative type for mounting in wall structure, unless shape, profile, or configuration is otherwise indicated on Drawings.
- E. Exposed Fasteners: Flush countersunk stainless steel screws, bolts, and rivets; finish to be same as factory finish indicated.
- F. Protective Coating for dissimilar materials: Clear acrylic; two coats; compatible with materials to be coated.

2.7 FACTORY FINISHING

- A. All surfaces of components, fabrications, and accessories to be factory finished to match colors selected by Architect from full range of colors.
- B. Painted Aluminum Finish: AA-M12C12R1x non-specular as fabricated mechanical finish, chemically cleaned, and prepared for applied coating; with organic coating.
 - 1. Superior Performing Organic Coatings: AAMA 2605, thermally cured polyvinylidene fluoride (PVDF) resin-based coating, fluoropolymer finish containing minimum 70 percent PVDF resins.
 - a. Number of Coats:
 - 1) Two (2) coat system, 1.2 mil minimum total dry-film thickness.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrates and anchor conditions are acceptable and are ready to receive work.
- C. Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install as indicated on Drawings and in accordance with Engineer's and manufacturer's instructions.
- C. Install components plumb and level, accurately fitted, free from distortion or defects.
- D. Apply two coats of clear acrylic coating to aluminum surfaces in contact with dissimilar materials and cementitious embedment. Application to be concealed from view.
- E. Install anchors required for connecting framing to structure.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

- C. Maximum Misalignment from True Position: 1/4 inch.
- D. Maximum Variation from Plane: 1/4 inch every 10 feet, non-cumulative.
- E. Maximum Variation from Plane Alignment of Two Adjoining Members: 0.015 inch.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protect installed construction.

END OF SECTION

SECTION 11 66 23
GYMNASIUM EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Scorer's Table.
 - 2. Gymnasium Floor Cover.
 - 3. Ball Storage Cage.
 - 4. Team Chairs.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D2261 - Standard Test Method for Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure (Constant-Rate-of-Extension Tensile Testing Machine); 2013, Editorial Changes 2017.
 - 2. ASTM D5034 - Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test):2021.
- B. National Electric Code (NEC):
 - 1. NEC Article 600 - Electric Signs and Outline Lighting; 2021.
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 701 - Standard Methods Of Fire Tests For Flame Propagation Of Textiles And Films; 2023.
- D. Underwriters Laboratories Inc. (UL):
 - 1. UL (DIR) - Online Certification Directory; Current Edition.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing product construction, sizes, configurations, jointing methods and locations, and functional components.
- C. Shop Drawings: Submit shop drawings including profiles, components, materials, accessories, joint/seam fabrication and locations, and installed use location/layout.
 - 1. Scorer's Table: Include details for folding/locking mechanism, caster type/sizes/quantities/locations, front signage panel attachment to table assembly, electrical requirements.
 - 2. Gymnasium Floor Protective Cover: Include plan indicating cover layout and fabric edge overlap locations. Include details of roller storage racks and quantities required for storage of all fabric rolls.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation Data: Include description of equipment operation and required adjusting and testing.
- C. Maintenance Data: Identify system maintenance requirements, parts list, servicing cycles, lubrication types required and local spare part sources.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section and with minimum five (5) years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Warranty durations are to begin on the date of Substantial Completion.
- C. Scorer's Table:
 - 1. Manufacturer's Warranty: Provide manufacturer's five (5) year warranty for materials and workmanship to be free of defects. Should a component or material fail to perform its function in normal use within this period, manufacturer is to provide matching repair or new replacement at no charge.
- D. Gym Floor Protective Cover and Storage Rack:
 - 1. Manufacturer's Warranty: Provide manufacturer's warranty for materials and workmanship to be free of defects. Should a component or material fail to perform its function in normal use within this period, manufacturer is to provide matching repair or new replacement at no charge.
 - a. Floor Covers: Warranty duration to be as follows.
 - 1) Weight of 27 - 31 oz/sq yd: Fifteen (15) years warranty duration.
 - b. Floor Cover Storage Racks: Twenty (20) years warranty duration.
- E. Ball Storage Cage: Provide manufacturer's standard warranty for materials and workmanship to be free of defects.
- F. Team Chairs: Provide manufacturer's standard warranty for materials and workmanship to be free of defects.
 - 1. Team Chairs: Manufacturer's standard duration but not less than one (1) year.
 - 2. Team Chair Storage Carts: Manufacturer's standard duration but not less than one (1) year.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.

- B. Scorer's Table: Furnish 3 spare lamps for the back-lit front panel sign.
- C. Gymnasium Floor Cover.
 - 1. Floor Cover Fabric: Provide 10 percent spare.
 - 2. Floor Cover Storage Racks:
 - a. Hand Cranks: Provide 2 spares.
 - b. Electric Power Winder: Provide 1 spare.
 - c. Roller Tube: Provide 1 spare (include 4 cover attachment clips).

PART 2 PRODUCTS

2.1 SCORER'S TABLE

- A. Manufacturers:
 - 1. Sideline Interactive, LLC.
 - 2. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Sideline Interactive, LLC - Backlit Static Table.
- C. Scorer's Table: Designed for interior use and as follows:
 - 1. Electrical components to be certified, listed, and labeled by the following standards organization(s) as suitable for the purpose indicated and installed conditions:
 - a. UL (DIR).
 - b. NECA 600.
 - 2. Electrical components to include electrical surge protection.
 - 3. Capable of withstanding strikes by balls and players.
 - 4. Free-standing unit, transportable, and with heavy-duty locking non-marring swivel casters.
 - a. Capable of folding for transport.
 - 5. Protective padding to be heavy-duty vinyl covered and secured to unit.
 - a. Color to be selected by Architect from manufacturer's full range.
 - 6. Table Length:
 - a. 10 feet.
 - 7. Front Panel Signage: Sign to be factory printed with custom graphics.
 - a. Single panel; full panel static graphics with electric back light illumination.
 - 1) Sized to length and height of table.
 - 2) Custom graphics design to be provided by the Architect.
 - 3) Shatterproof polycarbonate sheet protective cover.
 - 4) Maintenance access panel.
 - 8. Finishes and Colors:
 - a. To be selected by the Architect from manufacturer's full range.
 - b. Metal components to be powder coat finish.
 - 9. Electrical Power Strip: Integral power strip and media wire tray.

2.2 GYMNASIUM FLOOR COVER

- A. Manufacturers:
 - 1. CoverSports, a division of Humphrys.
 - 2. CoverMaster.
 - 3. Greatmats.
 - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
 - 1. CoverSports - GymGuard Gym Floor Cover.
- C. Gymnasium Floor Cover: Protective floor cover designed for interior use and as follows:

1. Physical Characteristics: Minimum requirements; comply with indicated standard.
 - a. Weight: 27 oz/sq yd, minimum.
 - 1) 8 oz woven polyester fabric coated with 19 oz PVC (9.5 oz each side).
 - 2) Tensile Strength: 315 lbs x 300 lbs (ASTM D5034).
 - 3) Tear Strength: 125 lbs x 90 lbs (ASTM D2261).
 - 4) Surface Finish:
 - a) Smooth surface.
 - b) Raised ellipse pattern surface.
 2. Waterproof, rot and mildew resistant, anti-fungal, and anti-bacterial.
 3. Color to be selected by Architect from manufacturer's full range.
 4. Fire Resistance: Comply with NFPA 701 (large scale), and requirements of local authorities having jurisdiction.
 5. Slip Resistant Surface: Comply with ADA and OSHA requirements.
 6. Seams to be heat weld sealed, minimum 1 inch wide, and are to lay smooth and flat.
 7. Roll Widths:
 - a. 10 feet wide minimum.
 8. Locations: Provide floor cover quantity for floor areas indicated.
 - a. Gymnasium.
 - 1) Entire floor area, less area under extended bleachers.
- D. Floor Cover Storage Racks: Engineered and designed to store multiple fully loaded floor cover rolls; mobile and stable base to deploy and load floor covers; allows for safe cover deployment by 2 persons.
 1. Quantity: Provide quantity of storage rack units as required to store required floor cover quantity.
 2. Storage Rollers:
 - a. 8 rollers per each storage rack unit.
 3. Size: Not to exceed 35 inches wide x 68 inches long x 79 inches high.
 4. Frame: Steel framing and stabilizing members with powder coat finish.
 5. Outriggers: Designed to stabilize storage rack during operational use; retractable with adjustable casters to prevent tipping; safety orange color.
 6. Brakes: Floor locking brakes to be at each end of storage rack.
 7. Casters: Lockable heavy-duty swivel casters; non-maintenance bearings for swivel and wheels; non-marring 3/4 inch tread thickness; 3 casters at each end.
 8. Roller Collars: Bright yellow collar on each end of every roller to eliminate finger pinching.
 9. Roller Brackets: Made of polycarbonate with delrin bearings. Mounted with 1/8 inch thick shock absorbing rubber pads.
 10. Roller Safety: Safety bolt on each bracket to prevent roller "pop-ups".
 11. Rollers: Non-corrosive tube; protective coated for clean handling.
 12. Fastening Clips: 4 push-on clips for each roller to secure floor cover sheet to roller.
 13. Hand Cranks: 2 cranks designed to engage both roller ends for loading floor covers.
 14. Accessories:
 - a. Electric Power Winder: Provide one (1) hand-held electric power winder designed to engage roller end for loading floor covers; include reverse rotation switch.
 - b. Floor Cover Brush Cleaner: Provide for each floor cover storage rack. Full width brush system designed to attach to the floor cover storage rack, Sweeps and cleans the floor cover on both sides simultaneously as each floor cover is cranked back (loaded) onto the rack rollers. Designed with two opposing sets of brush heads, each with a row of soft bristles of styrene fiber for fine particles and a row of stiffer polystyrene bristles for heavier debris.

- c. Storage Rack Cover: Provide one (1) for each floor cover storage rack. Designed to fully cover loaded and stored storage rack; material to be not less than 18 oz vinyl.
- d. Seaming Tape: Provide quantity required for Owner to deploy full coverage of floor cover for six (6) separate events. Extra strength, clear, 3 inches wide, and formulated for easy removal and leaving no glue residue on floor or floor cover.
- e. Seaming Tape Dispensers:
 - 1) Walk-Behind Tape Dispenser: Provide one (1), designed to apply 3 inch wide floor cover seaming tape by user walking behind dispenser in fully erect walking posture. Unit to include tape roll dispenser cradle designed for easy tape roll changeover, flat roller for compressing dispensed tape to application surface, and in-line secondary guide wheel. Handle to be adjustable to user's height. Constructed of heavy gauge steel and enameled or powder coated finished.
 - 2) Hand-Held Tape Dispenser: Provide two (2), designed to apply 3 inch wide floor cover seaming tape by user. Heavy-duty components; heavy gauge steel frame; ergonomically designed handle that won't twist under pressure during use.

2.3 BALL STORAGE CAGES

- A. Manufacturers:
 - 1. Gared Holding, LLC.
 - 2. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
 - 1. Gared - DBC Deluxe Ball Gage.
- C. Ball Storage Cage: Provide two (2) storage cage units of the following minimum requirements.
 - 1. Size: Overall unit to be 42 inches long x 24 inches wide x 42 inches high (from floor to top of frame's push handle).
 - a. Ball cage shape to be 42 inches long x 24 inches wide x 28 inches high.
 - 2. Construction: Frame to be 1 inch steel tube framing. Ball cage to be 3/16 inch steel wire welded to form 3 inch square grid sections. Cage top to be hinged and lockable.
 - 3. Finish and Color: Factory applied.
 - a. Powder coat; black color.
 - 4. Casters: Provide four (4) swivel casters; each caster with single 3 inch diameter wheel and non-marring tread of 1/2 inch thickness.

2.4 TEAM CHAIRS

- A. Team Chairs: Folding type with cushioned seat and backrest.
 - 1. Quantity: Provide thirty-three (33) chairs.
 - 2. Manufacturers:
 - a. Spec Seats.
 - b. Substitutions: Section 01 60 00 - Product Requirements.
 - 3. Basis of Design:
 - a. Spec Seats - Model DS100 Logo Series.
 - 4. Physical Characteristics:
 - a. Metal Frame: 18ga Galvanized Steel (DTC X-Frame)
 - b. Seat: Upholstered with 2.5 to 3 inch cushion thickness.
 - c. Backrest: Upholstered with 1 inch cushion thickness.
 - d. Front Leg: "K" brace with cross-brace.
 - e. Linking Bracket: 11 gauge steel.

- f. Leg Foot: Non-marring molded metal foot inserts.
 - g. Chair Weight: 20 lbs (9.1 kgs).
 - h. Frame Height: 33 inches, open; 40 inches, closed.
 - i. Frame Width: 18.25 inches, includes ganging.
 - j. Seat Height: 19.25 inches, from floor to top of seat.
 - k. Depth: 22 inches, front to back.
 - l. Folded Thickness: 4.5 inches.
5. Finishes:
- a. Metal surfaces to be factory applied powder coat finish.
 - b. Seat and backrest to be factory applied upholstery.
6. Colors: To be selected by Architect from manufacturer's full range.
7. Graphics: Custom graphics, factory applied to each chair.
- a. Separate graphics for seat cushion and seat backrest.
 - b. Graphics design to be provided by Architect.
8. Accessories:
- a. Team Chair Storage Carts: Platform type storage cart.
 - 1) Quantity: Provide quantity of storage carts required to store quantity of chairs indicated.
 - 2) Basis of Design:
 - a) Spec Seats - Model TSC106 (6 feet long, 4 casters).
 - 3) Size: 70 inches long x 36 inches wide x 82.5 inches high (88 inches high when loaded with folded chairs).
 - 4) Construction: Steel members designed and assembled to withstand loads imposed when cart is fully loaded and mobile. Cart structure to remain rigid and without racking during mobile use.
 - a) Provide each end of cart with rigid U-shaped handle tubing for pushing and pulling cart from either end.
 - b) Provide intermediate U-shaped tubing with adjustable location along length of cart. This member is to function as an adjustable "bookend" stop for chairs when cart is partially loaded.
 - 5) Casters: Lockable heavy-duty swivel casters; non-maintenance bearings for swivel and wheels; non-marring 3/4 inch tread thickness.
 - a) Minimum 4 casters for carts of length 8 feet or less.
 - b) Minimum 6 casters for carts longer than 8 feet and up to 10 feet.
 - (1) 2 of the 6 casters are to be located at carts mid-length.
 - 6) Finish and Color: Factory applied powder coat; black color.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are as required.
- C. Verify that surfaces and conditions are ready to accept the Work of this Section.
- D. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of Work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Products Requiring Installation: Install system components and accessories in accordance with manufacturer's printed instructions.
- C. Products Normally Stored Until Use: Assemble system components and verify functionality prior to demonstration to Owner.

3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust operating components to smooth operation without binding.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed Work in accordance with manufacturer's recommendations including cleaning procedures and materials.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage and unauthorized tampering.

3.7 DEMONSTRATION AND TRAINING

- A. Section 01 79 00 - Demonstration and Training.
- B. Provide demonstration and training to Owner regarding operation and maintenance of the Work of this Section.

END OF SECTION

SECTION 11 66 23.16
BASKETBALL BACKSTOPS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Indoor suspended backstops.
- B. Related Requirements:
 - 1. Section - 05 12 00 - Structural Steel.
 - 2. Section - 05 21 00 - Steel Joists.
 - 3. Section - 05 50 00 - Metal Fabrications: Supplementary framing.
 - 4. Division 26 - Electrical: Electrical service for winch operations and Work requirement for electrical work.

1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
 - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. American Welding Society (AWS):
 - 1. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020; Errata 2023.
- D. Athletic Associates: Comply with current requirements.
 - 1. National Association of Intercollegiate Athletics (NAIA).
 - 2. National Basketball Association (NBA).
 - 3. National Collegiate Athletic Association (NCAA).
 - 4. National Federation of State High School Associations (NFHS):
 - a. NFHS - Basketball Rules Book.
 - 5. International Basketball Federation (FIBA).
 - 6. International Olympic Committee (IOC).
- E. National Electrical Manufacturers Association (NEMA):
 - 1. NEMA MG 1 - Motors and Generators; 2021.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate backstops with structural system building framing as indicated in Specifications and Drawings to distribute loads to building framing without overloading building framing.
- C. Coordinate backstops and support framing layout to avoid interferences with the following:
 - 1. HVAC equipment, ductwork, outlets, and inlets.
 - 2. Fire suppression system piping and sprinkler heads.
 - 3. Lighting.
- D. Coordinate electrical requirements for the work in this Section with electrical service and connection points provided.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
 - 1. Submit data indicating loads, and materials of construction and thicknesses.
 - a. Indicate data for components and accessories.
 - b. Include manufacturer's full range of the following for selection by Architect:
 - 1) Colors and finishes.
 - 2) Graphics.
 - c. Include operational instructions.
- C. Suspended Backstops.
 - 1. Shop Drawings: Signed and sealed by licensed Professional Engineer.
 - a. Indicate size and location of backstops, mounting details, accessory anchoring members.
 - b. Indicate magnitude and location of loads imposed on building framing.
 - c. Show operable backstops in fully extended and retracted positions.
 - d. Indicate operator locations and mounting details. Include wiring diagrams for electric operators and controls.
 - 2. Design Data: Signed and sealed by licensed Professional Engineer.
 - a. Submit calculations for system, mounting, anchor, and structure design.
 - 1) Include foundation design for in-ground mounted units.
 - b. Submit calculations for supplementary framing required to attach backstops to building framing.
 - c. Indicate location and magnitude of loads imposed on building framing.
 - d. Seismic Design: Provide sealed calculations indicating that design of suspension systems provide compliance with seismic structural requirements indicated in the Performance and Design Requirements in this Section.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Include the following.
 - 1. Instructions for operational control systems, adjustments, and safety features.
 - 2. Parts catalog with complete list of replacement parts.
 - 3. Schematic wiring diagrams for electrical components.

1.6 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by UL or other testing firm acceptable to authority having jurisdiction.
- B. Perform welding in accordance with AWS D1.1/D1.1M.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience and approved by manufacturer.
- C. Welders and Welding Procedures: AWS qualified within previous twelve (12) months.

- D. Design backstops and support framing under direct supervision of licensed Professional Engineer experienced in design of this Work and licensed in the State in which the project is located.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept backstops on site in manufacturer's original packaging. Inspect for damage.
- C. Store backstops indoors, protected from weather and contamination until installed.

1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Indoor Suspended Backstops: Furnish lifetime manufacturer's warranty for masts and backboards.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 - 1. Furnish six (6) of each net type.
 - 2. Furnish four (4) manual crank tools and other tools required for backstop adjustments including adjusting height of backboard for play.

PART 2 PRODUCTS

2.1 INDOOR SUSPENDED BACKSTOPS

- A. Performance And Design Requirements:
 - 1. Design backstops including masts, backboards, and goals to meet requirements of NFHS and the following:
 - a. Withstand loads without damaging backstop.
 - b. Transfer loads to building structural frame to prevent overloading and damage to building.
 - c. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable codes.
 - 1) Seismic Design is to comply with requirements for the Seismic Design Category as indicated on the Structural Drawings and Section 00 31 00 - Available Project Information.
- B. Manufacturers:
 - 1. American Athletic, Inc.
 - 2. Draper, Inc.
 - 3. Performance Sports Systems.
 - 4. Porter Athletic Equipment Company.
 - 5. Progressive Sports Construction Group.
 - 6. Substitutions: Section 01 60 00 - Product Requirements.
- C. Basis of Design: Porter Athletic Equipment Company - Style 909xxxxx Series.
- D. Backstop systems suspended from building structure above:
 - 1. Suspended and forward folding retraction:
 - a. Operation:

- 1) Electric motorized winch.
 - b. Locations and Quantities:
 - 1) Main Court; two (2) backstop systems.
 - 2) Side Court: four (4) backstop systems.
- E. Masts:
 1. Center Post Masts: Single post at center of backboard with side sway bracing to eliminate sway and vibration during play.
 2. Tubular steel, welded construction.
 3. Overhead Mounting: Mast assembly extending vertically from overhead building structural frame to support backboard at position and height indicated on Drawings.
 - a. Design and provide supplemental steel framing as needed to span between and anchor to building structural frame and support mast at position indicated on Drawings.
 4. For retractable folding backstop systems, provide winches and safety straps with retractor reel.
 5. Furnish manufacturer's standard hardware for mast operation as specified.
- F. Winches - Motorized Operation:
 1. Electric motorized winch; sized to suit application with adjustable upper and lower limit switches.
 2. Geared drive and cables designed to hold backstop at any position.
 3. Motor: NEMA MG 1; 1/2 hp; 115 volts, single phase, 60 Hz; continuous duty rated.
 4. Controls: Provide remote, flush, wall mounted control station three position key switch.
 - a. Gang Control Switch: Provide winch operation control switches as follows.
 - 1) Main Court Backstops:
 - a) Individual switches for each main court backstop.
 - 2) Side Court Backstops:
 - a) Individual switches for each side court backstop.
 5. Disconnect Switch: Factory mount disconnect switch on equipment.
- G. Backboards:
 1. Glass Backboards: 1/2 inch thick clear shatter proof tempered glass, resiliently mounted in painted welded steel frame; target and border markings fired onto glass.
 2. Rectangular shape; 72 x 42 inches with manufacturer's standard mounting to suit mast; drilled for goal mounting.
 3. Molded safety padding installed along lower edge and corners.
 4. Adjustable Vertical Movement Mounting: Variable height with rim height ranging from 8 to 10 feet above finished floor.
 - a. Manual crank tool operated from floor beneath backboard.
- H. Goals and Nets:
 1. Goals: Steel, removable type; fabricated from 5/8 Inches rod; 18 Inches inside clear diameter; with no-tie style net hooks; painted finish; mounted directly to main mast.
 - a. Breakaway type; single rim, breakaway type; rigid play up to 230 lbs, flexible for forces greater than 230 lbs.
 2. Net: Woven chord, size, and style to fit goal; 15 to 18 inches long.
 - a. Competition Net: Anti-whip nylon.
- I. Shop Finishing:
 1. All metal components, parts, fasteners, and accessories to be powder coat finished.
 2. Color: As selected by Architect from manufacturer's full range.

2.2 ACCESSORIES

- A. Mounting Hardware: As designed and recommended by manufacturer.

2.3 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate components in largest practical sizes for delivery.
- C. Grind exposed welded joints flush and smooth with adjacent finish surface.
- D. Provide fittings and hardware to accommodate site assembly and installation.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify building structural frame is ready to receive backstops.
- C. Verify that finishing work, including painting, is complete before installing backstops.
- D. For work requiring electrical power connections, verify electrical power, with correct electrical characteristics, is installed at required locations and available.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install backstops in accordance with NFHS requirements.
- C. Assemble components furnished loose for field assembly.
- D. Install masts plumb and rigid at location indicated on Drawings.
- E. Install backboards plumb, level, and parallel to basketball court end line.
- F. Install goals level and adjust rim height to 10 feet above finish floor.
- G. Install safety padding on backboards.
- H. For winch operated backstops, install winches with cables connected to backstops.
- I. For motorized and control components, make electrical connections as required for operation.
- J. Touch up damaged finishes to match shop finish.

3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Requirements for starting and adjusting.

- B. Adjust moving components and controls for smooth and proper operation over full range of movement.
- C. For motorized components, adjust limit switches to prevent damage to equipment.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Requirements for protecting finished Work.
- B. Fully retract retractable backstops and disable operators until Substantial Completion.
- C. Protect install Work from damage.

3.7 DEMONSTRATION

- A. Section 01 79 00 - Demonstration and Training: Requirements for demonstration and training.
- B. Demonstrate to Owner representatives, operation and maintenance of operating components, and safety features.

END OF SECTION

SECTION 11 66 23.53**WALL PADDING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes wall padding and accessories.
- B. Related Requirements:
 - 1. Section 04 20 00 - Unit Masonry: Substrate.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Provide physical characteristics of wall pads and mounting accessories.
- C. Shop Drawings: Indicate dimensioned elevations layout (include cutouts at wall devices), unit sizes and thickness, describe finish method around cutouts at wall devices, mounting details and hardware.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes and colors available. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Submit Operation and Maintenance Data.

PART 2 PRODUCTS**2.1 WALL PADDING**

- A. Manufacturers:
 - 1. American Athletic, Inc.
 - 2. Draper, Inc.
 - 3. Performance Sports Systems.
 - 4. Porter Athletic Equipment Company.
 - 5. Progressive Sports Construction Group.
 - 6. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

- A. Wall Pads: Urethane foam, 3.7 lb. density, 2 inches thick; over 3/8 inch OSB wood panel; flame retardant vinyl coated polyester covering; compliant with state and local codes.

2.3 ACCESSORIES

- A. Wall Attachment Clip: Extruded aluminum.
- B. Z-Channels: Extruded aluminum.

- C. Floor Mounting Channel: Extruded aluminum, if Drawings indicate wall pads layout to extend to the floor.
- D. Molded Cutout Inserts: Factory molded and flame retardant rubber inserts for pad cutouts for accessing electrical outlets, switches, and wall devices. Color to be selected by Architect from manufacturer's full range.
- E. Fasteners to be non-corrosive and compatible with components and substrates.

2.4 FABRICATION

- A. Wall Pads: Adhere foam to backing board. Wrap finish covering to back of backing board and fasten securely. Provide a one inch fastener margin at top and bottom of backing board covered by finish covering. Fabricate in 2 feet wide by 6 feet tall panels, unless indicated otherwise on Drawings.

2.5 FINISHES

- A. Vinyl Coated Polyester Covering: Color as selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify adequacy of support framing and blocking.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

3.3 INSTALLATION

- A. Install wall pads in accordance with manufacturer's instructions and as indicated on Drawings.
- B. Use anchoring devices to suit conditions and substrate materials encountered.
- C. Set wall pads plumb, square, aligned at top and bottom with adjacent pads, and securely anchored to building structure.
- D. Provide anchorage to prevent wall pads from sliding laterally on z-clip mounting.
- E. Provide protected and finished cutouts for wall devices such as outlets and switches. Provide reinforced edge support at cutouts.
- F. Coordinate installation and location of wall pads with electrical drawings.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean wall pad covering and exposed mounting accessories.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.

END OF SECTION

SECTION 11 66 43
INTERIOR SCOREBOARDS

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes: Interior type electronic scoreboards including control center and other accessories for complete functional installation. Equipment to be designed for managing and displaying information for the following sports:
 - 1. Basketball.
 - 2. Volleyball.
 - 3. Wrestling.
- B. Related Requirements:
 - 1. Division 26 - Electrical; electrical related requirements.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- B. Federal Communications Commission (FCC):
 - 1. FCC Rules and Regulations, Part 15; Current Edition.
- C. National Electrical Code (NEC).
 - 1. NEC Article 600; Current Edition.
- D. Underwriters Laboratories Inc. (UL):
 - 1. UL 48 - Standard for Safety for Electric Signs; 2011, Revisions 2022.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Data for scoreboards, controls, and accessories shall include descriptions of control functions.
- C. Shop Drawings: Installation drawings, face layout, dimensions, construction, electrical wiring diagrams, and method of anchorage.
- D. Samples: For each component requiring color selection, provide to the Architect samples indicating the manufacturer's full range of colors, textures, and finishes for selection.
- E. Warranty(s) sample.
- F. Manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- A. Source Limitation: All components including scoreboard, control center, control cable, and other accessories and installation hardware shall be products of a single manufacturer.
- B. Manufacturer Qualifications: Company specializing in manufacturing electronic scoreboards with minimum ten (10) years of experience.
- C. Scoreboards and other electrical components shall be certified and labeled in accordance with UL 48 for use in the United States.

- D. Scoreboards and other electrical components are to be electrically grounded in accordance with NEC, Article 600.

1.5 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide manufacturer's warranty covering defects in materials and workmanship for a period of five (5) years beginning on the date of Substantial Completion.
 - 1. Exceptions:
 - a. Wireless Components: Provide manufacturer's warranty covering defects in materials and workmanship for a period of two (2) years beginning on the date of Substantial Completion.
 - b. Hand-Held Controls: Provide manufacturer's warranty covering defects in materials and workmanship for a period of one (1) year beginning on the date of Substantial Completion.

PART 2 PRODUCTS

2.1 SCOREBOARDS

- A. Manufacturers:
 - 1. Daktronics, Inc.
 - 2. Electro-Mech Scoreboard Company.
 - 3. Nevco Inc.
 - 4. Varsity Scoreboards.
- B. Basis of Design: Daktronics, Inc. - Model BB-2103.
- C. Interior type, multi-purpose basketball/volleyball/wrestling electronic scoreboard with two integral horns, changeable captions, LED displays for time, scores, periods, fouling player number with personal fouls, team fouls, bonus and double bonus indicators, and next possession arrows. Team Name Message Centers (TNMC) are to be provided.
 - 1. Size: 8 feet long x 6 feet high x 8 inches deep.
 - 2. Hanging Weight: Approximately 195 pounds.
 - 3. Captions:
 - a. 6 inches high:
 - 1) "Home"
 - 2) "Guest"
 - 3) Team Name Message Centers (TNMC)
 - b. 3 inches high:
 - 1) T.O.L. captions.
 - c. 4 inches high:
 - 1) All other captions not listed above.
 - 4. LED displays:
 - a. Timing: Super bright amber 13 inches high digits with lit colon.
 - b. Team Scores: Super bright red 13 inches high digits.
 - c. Period: Super bright amber 10 inches high digits.
 - d. Player Number With Personal Fouls, Game, And Weight: Super bright red 10 inches high digits.
 - e. Team Fouls, Games Won, And Match: 10 inches high digits.
 - f. Next possession: Super bright red arrow for each team.
 - g. Include bonus and double bonus as a 4 inch super bright amber LED "B".
 - h. Time Outs Left (T.O.L.): Super bright amber 7 inches high digits.
 - 5. Rear-lit captions are to require no maintenance.

6. Provide suspension anchoring and mounting.
 7. Power Requirement: 158 Watts, MAX, 100-240 Volts AC w/Power Factor Correction.
- D. Accessories:
1. Provide each scoreboard or accessory with control cable of length required. Electrical junction boxes, conduits, mounting hardware, and other accessories as required for installation are to be provided by others.
 2. Provide Upper Corner Logo / Sponsor Panels.
 3. Team Name Message Center (TNMC): "HOME" and "GUEST" caption plates to be replaced with programmable Team Name Message Center as manufactured by Daktronics Inc.
 - a. Specify changeable team names. (TNMC) Shall not require controller upgrade, use of additional accessories or computer.
- E. Control Center:
1. Basis of Design: Daktronics, Inc. - All Sport 5000 Series.
 2. Wireless, battery operated control center with receiver unit mounted at scoreboard.
 3. Handheld wireless type, basic, AA battery operated, sport specific, control center with receiver unit mounted at scoreboard.
 - a. Quantity: One (1) unit.
 - b. Unit is to comply with Part 15 of FCC Rules and Regulations.
 - c. Control Unit: Heavy duty aluminum case.
 - 1) Size: 4.25 x 16.25 x 9 inches.
 - d. Features:
 - 1) Wireless operation within 500 feet.
 - 2) Operate multiple scoreboards simultaneously.
 - 3) System allows multiple controllers to link to individual scoreboards.
 - 4) High visibility LCD display with a sealed keyboard.
 - 5) Provide external battery kit.
 - a) Basis of Design: Daktronics SL-04457.
 - 6) Provide 2.4 GHz spread spectrum radio control.
 - a) Basis of Design: Daktronics SL-04370.
 - 7) Provide Game Clock/Horn controller.
 - 8) Provide Shot Clock controller.
 - e. Receiver: Injection molded case, 5-1/2 by 3-3/4 by 2 inches mounted at scoreboard.
 - f. Maximum Range: 500 feet from control center to receiver.
 - g. Receiver is to require no additional source of power or separate control cable.
 - h. Power Adapters: Provide for each scoreboard receiver.
 - i. Provide carrying cases for control center and all necessary accessories.

2.2 MATERIALS

- A. Aluminum face and perimeter frame: Fabricated from 0.050 inch minimum thickness, ASTM B221 aluminum sheet.
- B. Finish: Acrylic polyurethane paint. Color to be as selected by Architect from manufacturer's full range of colors.
- C. Electronics: Low voltage, solid state, 2-wire cable, multiplex system, quartz crystal controlled.
- D. Provide fiber optic communication interface to reduce threat of damage from electrical storms.

- E. LED (Light Emitting Diode) Units: Seven-bar, segmented digits in protective aluminum cover, rated typical life 100,000 hours, and designed to provide excellent visibility from all angles and sides.
- F. Provide location specific universal power cord with plug for world-wide installation.
- G. Control cable where required are to be UL listed, 2-wire, type RG-58/U, coaxial cable, 1/4 inch diameter.
- H. Junction Boxes: Sheet metal box and cover, 4-1/2 x 2-1/8 x 2-1/8 inches minimum. complying with NEMA standards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify exact scoreboard and control center quantities and locations.
- C. Verify and coordinate equipment electrical requirements to ensure proper power source, conduit, wiring, boxes, points of connectivity are provided and in locations required. Prior to installation, verify type and location of power supply.
- D. Verify that power supplies are as required and that points of connection are located where required.
- E. Verify that field measurements are as required.
- F. Verify that surfaces and conditions are ready to accept the work of this Section.
- G. Verify that building roof structure has been designed for loads of suspended scoreboards.
- H. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- I. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Coordinate requirements for electrical power, wall blocking, auxiliary framing and supports, suspension cables, and other components to be provided under other Specification Sections to ensure adequate provisions are made for complete, functional installation of scoreboards.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the work in compliance with the design requirements, applicable codes, manufacturer's recommendations, and the contract documents.
- C. Before installation, field test scoreboards and accessories for operating functions. Ensure that scoreboards accurately perform all operations. Correct deficiencies.
- D. Rigidly mount scoreboards and accessories level and plumb with brackets and fasteners.
- E. Clean exposed surfaces.

- F. Protect scoreboards and finishes from other construction operations.

3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Test and adjust system operation to function as required.

3.5 DEMONSTRATING AND TRAINING

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.

END OF SECTION

SECTION 12 24 13
ROLLER WINDOW SHADES

PART 1 GENERAL**1.1 SUMMARY**

- A. Section includes roller window shades:
 - 1. Manually operating shades.
 - 2. Electric motorized operating shades.
- B. Related Requirements:
 - 1. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.
 - 2. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
 - 3. Section 08 44 13 - Glazed Aluminum Curtain Walls.
 - 4. Section 09 21 16 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures, and related accessories.
 - 5. Section 09 51 13 - Acoustical Panel Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures, and related accessories.
 - 6. Division 26 - Electrical: Coordination with electric service for motor controls.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Changes 2021.
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
 - 2. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films; 2023, Errata 2023.
- C. Window Covering Manufacturers Association (WCMA):
 - 1. WCMA A100.1 - Standard for Safety of Window Covering Products; 2022.

1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, project conditions, sequencing, application procedures, quality control, testing and inspection and production schedule.

1.4 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate with electrical contractor for appropriate location for power outlets as required by manufacturer's equipment and installation requirements.
- C. Coordinate with requirements of roller shade installer/dealer to ensure that no inaccessible areas are constructed.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
 - 3. Storage and handling requirements and recommendations.
 - 4. Mounting details and installation methods.
 - 5. Typical wiring diagrams.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
 - 1. Include wiring diagram.
 - 2. Include Shade Schedule indicating size, location, width, and keys to details.
 - 3. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- D. Samples for Initial Selection: For each finish product specified, submit two sets of shade material options and aluminum finish color samples representing manufacturer's full range of available colors and patterns. Include sample of shade material indicating fully fabricated bottom and side edges.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection of metal finishes, shade system components, unassembled, demonstrating compliance with specified requirements. Include shade material selection samples, 12 x 12 inches with face of material marked to indicate interior faces.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
- C. Manufacturer's Instructions and Maintenance Data: Methods for maintaining roller shades, precautions and recommendations regarding cleaning methods, cleaning materials and stain removal methods, instructions for operating hardware and controls.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, with a minimum of five (5) years documented experience in manufacturing products specified in this Section.
- B. Obtain roller shades through one source from a single manufacturer.
- C. Installer Qualifications: Installer trained and certified by the manufacturer. Company specializing in performing the type of work required in this Section, with a minimum of five (5) years documented experience.
- D. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- E. Electrical Components and System: In accordance with NFPA 70, components and system to be listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.
- F. Fungal Resistance: No growth when tested according to ASTM G21.

1.8 MOCK-UP

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. Provide a mock-up of one roller shade assembly for evaluation of mounting, appearance, and accessories.
 - 1. Locate mock-up at location designated by Architect.
 - 2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the submittal Shade Schedule.

1.10 PROJECT CONDITIONS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.11 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating twenty-five (25) year warranty.
- C. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five (5) year warranty.

PART 2 PRODUCTS

2.1 ROLLER SHADES

- A. Manufacturers:
 - 1. Carnegie.
 - 2. Draper, Inc.
 - 3. Hunter Douglas Corporation.
 - 4. Lutron Electronics Company, Inc.
 - 5. MechoShade Systems, Inc.
 - 6. Standard Textile.
 - 7. TimberBlindMetroShade.
- B. Basis of Design:
 - 1. MechoShade Systems, Inc.

2.2 MANUAL OPERATING SHADES

- A. Mounting:
 - 1. As indicated on Drawings.
 - 2. Provide factory finished headbox with removable fascia to conceal roller(s) and operating mechanisms from view at all sides.

- B. Width and Length:
 - 1. Shades are to cover entire wall opening unless indicated otherwise on Drawings.
- C. Colors: Colors for fabrics and components exposed to view unless indicated otherwise on Drawings.
 - 1. As selected by Architect from manufacturer's full range.
- D. Single Roller Type.
 - 1. Fabric Material Type:
 - a. Blackout material.
 - 2. Locations:
 - a. As indicated on Drawings.
- E. Fabric Material Types:
 - 1. Blackout Material: Opaque.
- F. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
 - 1. Provide a permanently lubricated brake assembly mounted on an oil-impregnated hub with wrapped spring clutch.
 - 2. Brake must withstand minimum pull force of 50 pounds (22.7 kg) in the stopped position.
 - 3. Mount clutch/brake assembly on the support brackets, fully independent of the roller tube components.
- G. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 pound (43 kg) minimum breaking strength. Provide upper and lower limit stops.
 - 1. Chain Retainer: Chain tensioning device complying with WCMA A100.1.

2.3 ELECTRIC MOTORIZED OPERATING SHADES

- A. Mounting:
 - 1. As indicated on Drawings.
 - 2. Provide factory finished headbox with removable fascia to conceal roller(s) and operating mechanisms from view at all sides.
 - 3. Fabric Retention System: Manufacturer's system of side channels with fabric retainer and light seal, and shade fabric fabricated with steel stays.
- B. Width and Length:
 - 1. Shades are to cover entire wall opening unless indicated otherwise on Drawings.
- C. Colors: Colors for fabrics and components exposed to view unless indicated otherwise on Drawings.
 - 1. As selected by Architect from manufacturer's full range.
- D. Single Roller Type.
 - 1. Material Type:
 - a. Blackout material.
 - 2. Locations:
 - a. As indicated on Drawings.
- E. Fabric Material Types:
 - 1. Blackout Material: Opaque.
- F. Controls:
 - 1. Provide single, 3-position, keyed switch control operation for raising and lowering of shades in synchronized level of motion and at variable stopping locations between fully open and fully closed positions. Motor operation is to automatically disengage when shades are in fully open and fully closed position as to not damage shade and

- roller and motorized drive mechanism. Install keyed switch control device at location as indicated on Drawings or as designated by Architect.
2. Provide wireless hand-held remote control device for each room in which motorized shades are installed. Furnish with each remote device, a wall-mountable device holder for installation by Owner.
- G. 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).
- H. Shade Motor Drive System:
1. Shade Motors:
 - a. Tubular motors with built-in reversible capacitor operating at 110v AC (60hz), single phase, temperature Class B, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor.
 - b. Provide for controlled operation for raising and lowering of shades in synchronized level of motion and at variable stopping locations between fully open and fully closed positions. Motor operation is to automatically disengage when shades are in fully open and fully closed position as to not damage shade and roller and motorized drive mechanism.
 - c. Conceal motors inside shade roller tube.
 - d. Maximum current draw for each shade motor of 2.3 amps.
 - e. Use motors rated at the same nominal speed for all shades in the same room.
 2. Total hanging weight of shade band shall not exceed 80 percent of the rated lifting capacity of the shade motor and tube assembly.

2.4 SHADE BAND

- A. 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.
 - b. Provide for positive mechanical engagement with drive / brake mechanism.
 - c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" "snap-off" spline mounting, without having to remove shade roller from shade brackets.
 - d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
 - e. Any method of attaching shade band to roller tube that requires the use of adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.5 SHADE FABRICATION

- A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. 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.
- C. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, ensure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.
- D. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.
- E. Blackout shadebands, when used inside channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet on center extending fully into the side channels. Battens shall be concealed in an integrally colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.
 - 1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
 - 2. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any see through of the batten pocket that shall not exceed 1-1/2 inches high and be totally opaque. A see-through moiré effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable.

2.6 COMPONENTS

- A. 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.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify field measurements are as shown on shop drawings.
- C. Examine substrates for conditions detrimental to installation of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

- D. Examine products to be installed for damage and other conditions detrimental to completion of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Verify that required electrical service is available, in proper location, and ready for installation of the work of this Section.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section. Prepare materials to be installed and equipment used during installation.
- B. Clean surfaces thoroughly prior to installation.
- C. Prepare surfaces for installation of the work.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install roller shades level, plumb, square, and true according to components in accordance with manufacturer's written instructions and located so shade band is not closer than 2 inches to interior face of glass. Allow proper clearances for window operation hardware.
- C. Motorized Operating Shades:
 - 1. Turn-Key Single-Source Responsibility: 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 mechanical and electrical drawings.
 - b. Contractor shall coordinate with requirements of roller shade installer/dealer to ensure that no 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 indicated on Drawings or otherwise 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.
 - 2. Ensure that all wiring is concealed in a tight, uniform installation. Coordinate with electrical contractor for appropriate location for power outlets as required by manufacturer's equipment and installation requirements.

3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed work from damage.

3.7 DEMONSTRATION AND TRAINING

- A. Section 01 79 00 – Demonstration and Training.
- B. Provide demonstration and train to Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

END OF SECTION

SECTION 12 48 13.13
ENTRANCE FLOOR MATS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Entrance floor mats.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data indicating properties and characteristics of products.
- C. Shop Drawings: Indicate dimensions and details of product and provide drawings indicating installation locations.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of colors, textures and pattern designs available; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected colors, textures, and pattern designs; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Maintenance Data: Include instructions for cleaning, stain removal, and materials to be used.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.4 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
- B. For each installed floor mat, provide one (1) additional of each size and each color to the Owner in its manufacturer's original packaging.

PART 2 PRODUCTS

2.1 FLOOR MATS

- A. Manufacturers:
1. Construction Specialties, Inc. (CSI).
 2. Pawling Corporation.
 3. Waterlock Floor Mats.
 4. Substitutions: Section 01 60 00 - Product Requirements.

- B. Basis of Design:
 - 1. Waterlock Floor Mats - Waterhog Classic Mats.
- C. Floor mats are to be designed and fabricated as units to be installed flat to finished floor surface without attachment to floor or other finishes.
 - 1. Flammability: Passes DOC-FF-1-70.
 - 2. Static Coefficient of Friction: Wet - 0.60 minimum when tested in accordance with ASTM D2047.
- D. Floor Mat Size: As indicated on Drawings.
- E. Floor Mat Total Thickness: 1/2 inch.
- F. Floor Mat Surface:
 - 1. Fiber Type: 100% polypropylene; solution dyed polypropylene.
 - 2. Weight: 24 oz/sq yd, minimum.
 - 3. Nub Height: 1/4 inch, minimum.
 - 4. Nub Pattern Design:
 - a. To be selected by Architect from full range.
 - 5. Color:
 - a. To be selected by Architect from full range.
- G. Floor Mat Backing:
 - 1. Type: Non-skid rubber.
 - 2. Thickness: 1/4 inch, minimum.
- H. Floor Mat Border: Mat perimeter to have integral continuous border; permanent bond to mat surface backing; 1-1/2 inch wide, tapered to floor; rubber or vinyl.
 - 1. Border interior edge (adjacent to mat fibers) to be raised to serve a water dam, capable of holding no less than 1 gallon of water per square yard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are as required.
- C. Verify that surfaces and conditions are ready to accept the work of this Section.
- D. Examine products to be installed for damage and other conditions detrimental to completion of the work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Clean substrate for installation.

3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the work in compliance with the design requirements.

3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

END OF SECTION

SECTION 12 66 13
TELESCOPING BLEACHERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Telescoping bleachers.
 - a. Electric motor operators, controls, and internal wiring.
- B. Related Requirements:
 - 1. Division 09 - Finishes: Sections indicating flooring system on which bleachers set and operate. Refer to COORDINATION article in this Section.
 - 2. Contract Documents related to wall construction adjacent to rear of bleachers system.
 - 3. Division 26 - Electrical: Sections regarding electrical work.

1.2 REFERENCE STANDARDS

- A. Americans with Disabilities Act (ADA):
 - 1. ADA Standards - ADA Standards for Accessible Design; Current Edition.
- B. ASTM International (ASTM):
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
 - 2. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
 - 3. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
 - 4. ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable; 2016.
 - 5. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2023.
 - 6. ASTM D2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics; 2022.
 - 7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- C. American Welding Society (AWS):
 - 1. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, Errata 2023.
 - 2. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, Errata 2022.
- D. International Code Council (ICC); International Building Code (IBC):
 - 1. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
 - 2. ICC 300 - Bleachers, Folding And Telescopic Seating, And Grandstands; 2023.
- E. National Fire Protection Association (NFPA):
 - 1. NFPA 102 - Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2021.
- F. National Institute of Standards and Technology (NIST):
 - 1. NIST PS 1 - Structural Plywood; 2023.

1.3 COORDINATION

- A. Coordinate requirements of the work of this Section with finish flooring requirements for adequate support and operation of the bleacher system.

1. In the case of a composite finish flooring systems (e.g. wood strip flooring on plywood and sleepers), coordinate flooring and bleachers requirements for solid blocking within the flooring assembly for adequate weight support of retracted, fully extended, and fully loaded bleacher system supports.

1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures: Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
- C. Shop Drawings: Indicate layout and dimensions of bleacher units including seat heights, row spacing and rise, aisle widths and locations, overall dimensions in closed and open position, connections, and relationship to adjoining work, accessories, types of materials and finishes.
 1. Include data for structural computations, materials properties, and other information needed for structural analysis. Data is to be signed and sealed by a qualified Professional Engineer responsible for preparation of data, and licensed in the State in which the project is located.
 2. Provide shop drawings specific to this Project.
 3. Graphics Layout Drawings: Indicate pattern of seat colors as indicated on Drawings.
 4. Wiring Diagrams: Show locations of motors, electrical wiring, and rough-in connections.
- D. Samples for Initial Selection: For each material for which color selection is required, submit samples, 2 by 2 inches in size, illustrating the full range colors and finishes available; submit for Architect's initial selection.
- E. Samples for Verification: From the Architect's initial selections, submit samples of actual finish or product, for verification of color selection.
- F. Certifications: Provide qualifications certification for the following:
 1. Manufacturer.
 2. Installer.
 3. Engineer.
 4. Welders.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Manufacturer's operation and maintenance instructions, including annual inspection and maintenance and bi-annual inspection by a Professional Engineer or manufacturer factory service personnel.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Design to comply with all applicable code requirements.
- B. Seating Layout: Comply with current ICC 300 for Folding and Telescopic Seating, except where additional requirements are indicated or imposed by authorities having jurisdiction.
- C. Welding Standards & Qualification: Comply with AWS D1.1/D1.1M and AWS D1.3/D1.3M.

1.7 QUALIFICATIONS

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section, with not less than ten (10) years of documented experience.
- B. Installer Qualifications: Certified as approved by Manufacturer.
- C. Engineer Qualifications: Bleacher system to be designed, sealed and signed by a Registered Professional Engineer.
- D. Welder Qualifications: Certified by AWS for the processes employed.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept products in manufacturer's packaging clearly labeled with manufacturer name and content. Inspect for damage.
 - 1. Store, in original packaging, under cover and elevated above grade.

1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer's five (5) year warranty for all work and materials to be free of defects. Replace parts that fail under normal use at no extra charge to Owner.

PART 2 PRODUCTS

2.1 BLEACHERS

- A. Manufacturers:
 - 1. Hussey Seating Company.
 - 2. Interkal, LLC.
 - 3. Irwin Seating Company.
 - 4. Kodiak Seating by Royal Stewart Ltd.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Basis of Design:
 - 1. As indicated on Drawings.

2.2 TELESCOPING BLEACHERS

- A. Telescoping Bleachers: Factory assembled tiered benches that retract horizontally into depth approximately the same as a single row depth, with fixed seats mounted on leading edge of platforms.
 - 1. Bleacher system to be designed, sealed and signed by a licensed Professional Engineer licensed in the State in which the Project is located.
 - 2. Provide a design that has been in use for at least 5 years; submit documentation.
 - 3. Design to comply with applicable requirements of NFPA 102 and requirements of code authorities having jurisdiction; where conflicts between requirements occur, comply with whichever is more stringent.
 - 4. Design with solid seat fronts that conceal interior mechanisms when fully retracted, fitting tightly enough to prevent climbing up face; at front row provide key locked, hinged fascia (skirt) to cover gap between seat riser/fascia and floor.
 - 5. Configurations: As indicated on Drawings.
 - 6. Operation:

- a. Electric motor operation.
 7. Extension Direction:
 - a. Forward-Fold Extension: Top row fixed to floor, adjacent to wall under overhang, forward extension (away from wall); attachment to wall is acceptable when Registered Engineer's design includes anchorage designed for wall construction.
 8. Wheelchair Viewing Spaces: Provide wheelchair viewing spaces as follows. Provide removable railings at row behind wheelchair spaces. All wheelchair viewing spaces are to comply with ADA Standards.
 - a. Retractable Wheelchair Spaces: Provide manually retractable spaces with operation that does not affect other seating rows. Number of spaces and locations to be as follows:
 - 1) As indicated on Drawings.
 - b. Permanently Open Wheelchair Space: Provide permanently open spaces. Number of spaces and locations to be as follows:
 - 1) As indicated on Drawings.
 9. Cutouts: Fit units to irregular wall surfaces, columns, pilasters, roof drain leaders, and other obstructions; take field measurements prior to fabrication.
- B. Design Loads: Design to withstand the following loading conditions, in addition to its own weight:
1. Live Load on Structural Supports: 100 pounds per square foot minimum, of gross horizontal projection.
 2. Live Load on Seats and Walking Surfaces: 120 pounds per linear foot.
 3. Structural Supports Sway Parallel to Seats: 24 pounds per linear foot of row combined with Uniformly Live Load.
 4. Structural Supports Sway Perpendicular to Seats: 10 pounds per linear foot of row combined with Uniformly Live Load.
- C. Dimensions:
1. Overall dimensions as indicated on Drawings.
 2. Other dimensions unless indicated otherwise on Drawings:
 - a. Rise Per Row:
 - 1) 11-1/2 inches.
 - b. Row Depth:
 - 1) 26 inches from seat front to next seat front (13.2 inches minimum clear aisle. Comply with ICC (IBC)).
 - c. Seat Height Above Tread: 6-1/2 inches.
- D. Structural Supports: Steel or aluminum; wheeled carriages supporting each tier separately, with moving parts permanently lubricated and metal parts cushioned to prevent metal-to-metal contact during operation.
1. Design each row carriage so that it will individually support the design loads and is self-supporting when fully assembled without dependence on platform panels or boards, seats, or fascia.
 2. Vertical columns and deck supports.
 3. Stabilized by sway braces attached to the vertical columns and steel risers for strength and resistance to movement. Sway braces fabricated from steel to resist compression and tension forces created when the bleachers are loaded.
 4. Vertical columns, minimum 2 x 3 inches closed seam, rectangular structural steel tubing. Post size as required for row height and load bearing requirements.
 5. Rigid deck support brackets to prevent sagging and binding during operation.
 6. All deck supports are to incorporate rollers for efficient operation and deck stability.

7. Continuous structural galvanized steel nose-beam to which the seat surface is attached for a uniform understructure providing strength and continuous support for the plywood deck.
 8. Low friction flexible rod sliding system with positive engagement of vertical supports without binding. Provide smooth operation over floor. Maintain proper vertical column spacing and eliminate racking damage.
 9. Welding: In accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M.
 10. Bolting: Use lock-washers or locknuts.
 11. Wheels: Minimum 5 inches diameter by 1-1/8 inch wide, with non-marring heavy duty composition rubber tires; ball, roller, or oil-impregnated metal bearings; minimum of 2 wheels at each floor support.
 12. Finish: Manufacturer's standard enamel or powder coating. Color, black.
 13. Row Locking: Automatically mechanically lock each carriage to adjacent carriages when fully extended.
 14. Unlocking (Motorized Operation): Automatically unlock all rows before engaging retraction mechanism.
 15. Rollers On Each Deck Support: Provide nylon rollers at the top of every deck to reduce friction, provide smooth and quiet operation, provide deck stability, and to eliminate steel-to-steel contact that might hinder the operation of the bleacher.
 16. Nose-beam splice, 4-bolt pattern, minimum.
 17. Section splice, 8-bolt pattern joint connections, minimum.
- E. Motor Operation:
1. Integral Power: Integral automatic electromechanical powered frame propulsion system, to open and close telescopic seating. Integral Power and Control System shall be Underwriters Laboratories, Inc. (UL) approved and listed.
 2. Operation with removable pendant control unit which plugs into seating bank for operator management of stop, start, forward, and reverse control of the power operation.
 3. Each Powered Frame unit consists of output shaft gear reducer. Reducers shall be fitted with 3 phase induction motors which will provide an average operating speed of 46 fpm.
 4. Operating Loads: Each Powered Frame is to provide 220 lbs pull force which equals approximately 28 psi lateral force on the floor.
 5. Limit Switches: Provide both open and closed limit switches for the integral power system. The limit switches will automatically stop integral power operation when seating has reached the fully extended or closed position.
 6. Motion Monitor: Provide flashing light with self-contained warning horn rated at 85 db at 10 feet mounted under telescopic seating for audio and visual warning during integral power operation.
 7. Electrical: Each power frame unit is power operated by a 1/2 horsepower, 1,725 RPM, 208 Volts, 60 Hz., three phase, 1.25 service factor motor.
 8. Provide access to motor from front side of bleachers; a hinged front skirt or hinged section at least 30 inches (760 mm) wide is acceptable.

2.3 MATERIALS

- A. Plywood: NIST PS 1, A-C Exterior Grade.
- B. Structural Steel Shapes, Plates and Bars: ASTM A36/A36M.
- C. Structural Tubing: ASTM A500/A500M, Grade B.
- D. Polyethylene Plastic: ASTM D1248, Type III, Class B.

2.4 SEAT AND PLATFORM COMPONENTS

- A. Seat/Fascia Assembly: Continuous, molded UV-stabilized high-density polyethylene plastic, seat minimum 1 inch thick, textured finish, homogeneous color throughout, color as selected from manufacturer's full range color selection; independently removable with tongue-and-groove or rabbeted interlock at end joints; stain and warp resistant.
1. Attaching clamp for a steel-to-steel connection of the module to the 14-gauge galvanized steel nose beam.
 2. Each module to incorporate full 1/2 inch perimeter interlocks to secure one module to the next for increased strength.
 - a. Minimum five (5) vertical and two (2) lateral ribs inside each module for strength.
 - b. 360 degree interlocking connection.
 3. 18 inches wide interlocking seat module with seat height of 18-1/2 inches.
 4. Seat depth as required by applicable codes and as indicated herein and on Drawings.
 5. Shape: Ergonomically contoured, with internal ribs spaced for natural flexibility; rear edge cantilevered to provide toe room of not less than 3 inches; no openings to trap debris.
 6. Fire Retardance: Self-ignition temperature of 650 degrees F (343 degrees C) or greater when tested in accordance with ASTM D1929; smoke developed index of 450 or less, when tested in accordance with ASTM E84, or 75 or less when tested in thickness intended for use in accordance with ASTM D2843; and burning extent of 1 inch or less when tested in thickness intended for use in accordance with ASTM D635.
 7. Provide end caps of same material and finish on each exposed end.
 8. Supports: Internal steel reinforcement of each seat segment bolted to platform nose member; minimum two bolts per segment.
 9. Seat Numbers: Provide each plastic seat module with a 1-3/4 x 1-1/4 inch oval etched polycarbonate plate. Provide black numerals on plate fitted in a vandal resistant recess.
 10. Row Letters: Provide at each row end of plastic seat a 1-3/4 x 1-1/4 inch oval etched polycarbonate plate with black numerals. Plates to be fitted flush in vandal resistant end cap recess.
- B. Platform, Tread, and Step Structure: Plywood continuously supported on front and rear and with aluminum "H" Beam at every plywood joint for continuous support from rear riser to nose-beam.
1. Plywood: PS 1, 5-ply southern pine or polyethylene-overlaid Douglas Fir or Southern Pine, Grade A-C.
 2. Plywood Thickness: 5/8 inch, minimum.
 3. Platform (Deck) Plywood Finish: Exposed wear surfaces to be finished with a layer of High Density polyethylene plastic 0.025 - 0.030 thick, Light Gray in color. Concealed surfaces sealed with manufacturer's standard sealer or urethane sealer.
 4. Front (Nose), Rear, and Intermediate Supports: Steel channel or tube, hot-dipped galvanized.
 5. Nosings: Formed steel, minimum, G60/Z275 hot-dipped galvanized.
 6. Rear Riser: Continuous metal sheet, formed to conceal vertical void from bottom of seat modules to platform (deck). Form bottom edge to continuously receive edge of platform (deck) edge and conceal joint. Form top edge to continuously conceal undercarriage supports for upper platform (deck) framing, but allow continuous access joint for removal of seat modules. Minimum 14-gauge, grade 50, galvanized steel sheet.
 7. Provide end caps of same material and finish on each exposed end.

8. At aisles provide permanently attached intermediate steps of same construction and finish.
 - a. Designed to comply with applicable code requirements, providing an equal depth and height foot surface between rows.
 - b. Provide safety abrasive tread on all steps with 2 inches wide contrasting stripe at nosing.
9. At bottom of aisles provide step in front of first riser, hinged to first platform to fold for storage.

2.5 HANDRAILS AND RAILINGS

- A. Provide the following railings:
 1. Aisle Handrails: Self-Storing Aisle Rails (SSAR). 36 inches high, permanently bolted in position and automatically store in the deck, ensuring that the rails are in place at all times for spectator safety.
 2. End of Row Guardrails: 42 inches high and required on open ends of telescopic seating systems. Self-Storing End Rails designed and tested to meet all current national building code requirements.
 3. Top Row Rear Guardrail: Only required in such conditions where the top row does not abutt to a wall that is a minimum height of 48 inches above the top row. Non-removable self-storing, mounted behind rear seat with tubular supports, running full width of section.
 4. Wheelchair Spaces Guardrails: Removable; 42 inches high.
 5. Height: 42 inches (1067 mm) above adjacent platform or tread.
 6. Removable Railings: Provide steel post sockets attached to platform supports.
- B. Engineer handrail, railing and guardrail systems to withstand the following loads:
 1. Handrailings, Posts and Supports:
 - a. Concentrated Load: 200 pounds applied at any point and in any direction.
 - b. Uniform Load: 50 pounds per foot applied in any direction.
 2. Guardrailings, Posts and Supports:
 - a. Concentrated Load: 200 pounds applied at any point and in any direction along top rail.
 - b. Uniform Load: 50 pounds per foot applied horizontally at top rail and a simultaneous uniform load of 100 pounds per foot applied vertically downward.
 - c. Guardrailings system shall not allow a 4 inches diameter sphere to pass through.
- C. Railing Construction: Round steel or aluminum pipe or tube, with formed elbows at corners and caps at ends of straight runs.
 1. Aluminum: 1.66 inches minimum outside diameter; textured powder coat epoxy finish.
 2. Steel: 1-1/2 inch minimum outside diameter, with 11 gage, 0.12 inch minimum wall thickness; textured powder coat epoxy finish.

2.6 ACCESSORIES

- A. Fillers and Closures:
 1. Ends of Retracted Units: Plywood panels, finished to match platforms.
 2. Top Row: Provide seat level rear filler panels to close openings between top row seat and wall; finish to match platforms.
 3. Back of Units: Only required in such conditions where the back of the bleacher system is not concealed by a wall.
 - a. Full width plywood panels, finished to match platforms, up to 8 feet above floor; vinyl curtains above to underside of top platform.

4. Sides of Extended Units: Laminated Vinyl Side Curtains to close-off the ends of the bleachers.
 - a. Grommets at every hanger location, chain weight bottom hem.
 - b. Color as selected by Architect from manufacturer's full range of colors.
- B. Motion Monitor: Strobe light and warning horn rated at 150 dB, both of which operate continuously during movement of any section of bleachers; mount strobe light where it is clearly visible to entire bleacher installation.
- C. Removable Timer's Table:
 1. 15 inches wide by 96 inches long.
 2. High pressure laminated work surface with removable legs for use at any location.
 3. Table legs assembly shall be constructed of finished tubular steel and shall be removable for storage within the seating system.
- D. Fasteners: Provide hardware and fasteners in accordance with manufacturer's recommendations.
- E. Anchorage: Provide anchorage hardware in accordance with manufacturer's recommendations and as indicated on Drawings.
- F. Provide manufacturer's tool (device) used as an operating handle for manually extending and retracting the bleachers. Provide total number of tools needed for easy operation, but no less than four (4) such devices.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that field measurements are consistent with those on the shop drawings.
- C. Verify that electrical rough-ins have been installed and are accessible.
- D. Do not begin installation until substrates have been properly prepared and area has been cleared of obstructions.
- E. Verify that flooring support and solid blocking has been stalled where required.
- F. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section. Prepare materials to be installed and equipment used during installation.
- B. Clean surfaces thoroughly prior to installation.
- C. 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. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install in accordance with manufacturer's instructions.
- C. Do not field cut or alter seats, fascia, or structural members without approval.

- D. Provide manufacturer's field representative to inspect completed installation.

3.4 ADJUSTING

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Set limit switches to provide fully closed and fully extended positions.
- C. Lubricate, test, and adjust each moving assembly to ensure proper operation in compliance with manufacturer's recommendations.

3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean and remove excess construction debris from area. Coordinate cleaning of flooring with the flooring installer to avoid improper or damaging cleaning efforts.
- C. Clean exposed and semi-exposed assembly surfaces.
- D. Touch up finishes on damaged or soiled areas.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed products until completion of project.
- C. Touch-up, repair, or replace damaged products.

3.7 DEMONSTRATION AND TRAINING

- A. Section 01 79 00 - Demonstration and Training.
- B. Provide manufacturer's field representative to provide training and demonstration.
 - 1. Location: On site using installed equipment.
 - 2. Time: As agreed between Owner and Contractor.
- C. Train Owner's representative on the operation and safety features for fully extending and retracting bleachers.
- D. Identify service requirements and serviceable parts.
- E. Identify remedial procedures for common operational errors such as jammed mechanisms.

END OF SECTION

