



ARCHITECTS

Capital Bank Plaza

333 Fayetteville Street, Suite 225

Raleigh NC 27601

PROJECT MANUAL

VOLUME 1 (of 2)

Divisions 00 thru 19

Moore County Schools

5277 Hwy. 15-501 South
Carthage, NC 28327

Gym Modernizations/Renovations Phase 2

Architect's Project Number: 02206.100

Job Site Locations:

Sandhills Farm Life Elementary School
2201 Farm Life School Road
Carthage, NC 28327

Vass-Lakeview Elementary School
141 James Street
Vass, NC 28394

November 22, 2023

Bid Set

Set Number: _____

SECTION 00 01 01

PROJECT TITLE PAGE

Date November 22, 2023
Bid Set

Project Identification Gym Modernizations/Renovations - Phase 2
Architect Project No.: 02206.100

Job Site Locations:
Sandhills Farm Life Elementary School
2201 Farm Life School Road
Carthage, NC 28327

Vass-Lakeview Elementary School
141 James Street
Vass, NC 28394

Owner Moore County Schools
5277 Hwy. 15-501 South
Carthage, NC 28327
Telephone: 910-947-2976

Architect SfL+a Architects
333 Fayetteville Street, Suite 225
Raleigh, North Carolina 27601
Telephone: 919-573-6350

Plumbing Engineer
Mechanical Engineer
Electrical Engineer Triad Engineering Consultants, Inc.
2638 Willard Dairy Road, Suite 100
High Point, NC 27265
Telephone: 336-454-0225

Roofing Engineer Terracon Consultants, Inc.
2401 Brentwood Road, Suite 107
Raleigh, NC 27604
Telephone: 919-873-2211

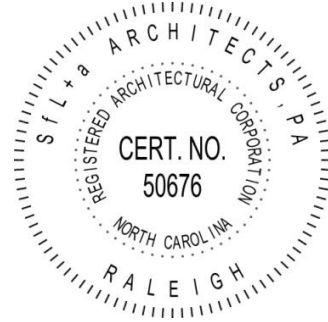
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SEALS PAGE

Architectural

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



Architectural

SfL+a Architects, PA
Mahan Raspa Kick
NC Registration Number 11847



Plumbing Engineering
Mechanical Engineering
Electrical Engineering

Triad Engineering Consultants, Inc.
Perry V. Gulledge
NC Registration Number 14498



Roofing Engineering

Terracon Consultants, Inc.
Jeffery H. Poe, Jr.
NC Registration Number 045268



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Moore County Schools invites single prime bids on the project known as the “Gymnasium Modernizations & Renovations – Phase 2”. Sealed bids will be received at the office of the Moore County School Board, 5277 US-15, Carthage, NC 28327, until 2:00 p.m. on Thursday, December 21, 2023. All bids will be opened and read aloud starting at 2:05 PM in the Board Room at the Administrative Offices facility. This project will bid and awarded in accordance with G.S143-128, G.S. 143-129.

Work of the Project includes construction and renovation of the gymnasiums located at Sandhills Farm Life Elementary School (SFLES) & Vass-Lakeview Elementary School (VLES); complete roof replacement of both high and low roofs at both locations; replacement of exterior windows at VLES; installation of new air conditioning mechanical equipment at both locations; construction of new ADA accessible group toilets at VLES; updating of electrical systems as necessary for new mechanical systems at both locations.

A Pre-Bid Conference will be held on Wednesday, December 13, 2023, at 10:00 a.m. starting at Vass-Lakeview Elementary school, 141 James St, Vass, NC 28394. A tour of SFLES location will follow. All questions after that date/time shall be submitted to the Design Consultant at Sfl+a Architects, 333 Fayetteville Street, Suite 225, Raleigh, North Carolina 27601 or via email to: mkick@sfla.biz

Contract Documents, including drawings and specifications, may be downloaded from Sfl+a Architects’ ShareFile website at: <https://sfla.sharefile.com/d-s005341c7d38b48b5b7fb83c7ad26dba8> (email link available upon request to mkick@sfla.biz); obtained from the Construct Connect (iSqFt) website at: www.constructconnect.com; 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 Monday, November 27, 2023; or contract documents are also available for review at Moore County Schools school facilities office, 5277 US-15, Carthage, NC 28327 during normal business hours – call Amy McCune ahead to schedule an appointment (910-947-2976).

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 sixty (60) 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.

Moore 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.

Date for Publication: Sunday, November 22, 2023

END OF DOCUMENT

SECTION 00 21 13
INFORMATION FOR BIDDERS

A-1. SUBMISSION OF BIDS AND BID OPENING:

- A. Bids will be received by Moore 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 Moore County School Board, Board Room, 5277 US-15, Carthage, NC 28327 and marked on the outside of the envelope Proposal for Moore County Schools – Gymnasium Modernizations – Phase 2, 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 and Federal Uniform Guidance, 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 sixty (60) 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. Asbestos Materials Information.

1.2 ASBESTOS MATERIALS INFORMATION

- A. A copy of the referenced information is included in PART 3 of this Section.
 - 1. Title: Limited Asbestos Inspection Report, Moore County Schools Gymnasium Renovation Project, Sandhills Farm Life Elementary School, Carthage Elementary School, and Vass-Lakeview Elementary School.
 - 2. Prepared For: Mr. Bradley Garner, Director of Facilities and Construction; Moore County Schools, 5277 Hwy. 15-501 South, Carthage, North Carolina 28327.
 - 3. Prepared By: Terracon, 2401 Brentwood Road, Suite 107, Raleigh, North Carolina 27604; Anthony Scialdone, Senior Scientist.
 - 4. Preparer's Project No.: 70237323.
 - 5. Date: July 6, 2023.
 - 6. Total Pages: 54 pages.
- B. This information is made available to bidders for review regarding the presence of asbestos containing materials (ACM) in the existing Project areas.
- C. This information is part of the requirements of this Contract where specifically referenced in Contract Documents.
- D. Contractor is required to contract with appropriately State certified and licensed asbestos abatement professionals for complete abatement activities in accordance with the State regulatory requirements. Abatement professionals are to be certified and licensed in the State in which the project is located and are to be responsible for the abatement planning, abatement actions, proper disposal of materials, and certification of test results report.
 - 1. Contractor is to contract for all asbestos abatement work as represented in the Asbestos Materials Information indicated in this Section, and the Asbestos Abatement Specifications in Section 02 82 13 - Asbestos Abatement.
 - 2. Owner may contract for separate air monitoring and project oversight services associated with the asbestos abatement work. Contractor is to coordinate abatement work and schedule with Owner for coordinated work and services performance.
- E. This information, by its nature, cannot reveal all conditions existing within the Project area. Should concealed conditions of hazardous materials or other hazardous materials be found, changes in the presence of asbestos containing or other hazardous materials will require additional measures for removal, with resulting credits or expenditures to Contract Price accruing to Owner.

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.



2401 Brentwood Road, Suite 107
Raleigh, North Carolina 27604
P (919) 873-2211
Terracon.com

July 6, 2023

Moore County Schools
5277 US Highway 15-501 South
Suite 650
Carthage, North Carolina 28327

Attn: Bradley Gardner
Director of Facilities and Construction
E: bgardner@ncmsc.org

Re: Limited Asbestos Inspection Report
Moore County Schools Gymnasium Renovation Project
Sandhills Farm Life Elementary School, Carthage Elementary School, and Vass-
Lakeview Elementary School
Moore County, North Carolina
Terracon Project No. 70237323


Dear Mr. Gardner:


The purpose of this report is to present the results of the asbestos inspection performed on June 26, 2023 for the Moore County Schools Gymnasium Renovation Project at Sandhills Farm Life Elementary School, Carthage Elementary School, and Vass-Lakeview Elementary School in Moore County, North Carolina. This inspection was conducted in general accordance with Terracon Proposal No. P70237323, dated May 30, 2023. We understand that these services were requested due to the planned renovations of the gymnasium buildings at these school campuses.

Asbestos was detected in samples collected from the buildings. Please refer to the attached report for details.

Terracon appreciates the opportunity to provide these services to Moore County Schools. If you have any questions regarding this report, please contact the undersigned at (919) 873-2211.

Sincerely,
Terracon Consultants Inc.


Anthony Scialdone
Senior Scientist


Chris Murray, CIH, CMR
Authorized Project Reviewer

Limited Asbestos Inspection Report

Moore County Schools Gymnasium Renovation
Project

Sandhills Farm Life Elementary School,
Carthage Elementary School, and Vass-
Lakeview Elementary School
Moore County, North Carolina

2401 Brentwood Road, Suite 107
Raleigh, North Carolina 27604
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- Materials



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Limited Asbestos Inspection Report
Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina
July 6, 2023 | Terracon Project No. 70237323



1.0 Introduction

Terracon Consultants, Inc. (Terracon) conducted a limited asbestos inspection for the Moore County Schools Gymnasium Renovation Project at Sandhills Farm Life Elementary School, Carthage Elementary School, and Vass-Lakeview Elementary School in Moore County, North Carolina. The inspections were conducted on June 26, 2023 by a State of North Carolina Accredited Asbestos Building Inspector in general accordance with Terracon Proposal No. P70237323, dated May 30, 2023.

Building components anticipated to be impacted by the renovations were visually assessed and homogeneous areas of suspect asbestos-containing materials (ACM) were identified and documented. The inspection was limited to safely accessible areas of the buildings. Suspect ACM samples were collected in general accordance with the sampling protocols outlined in Environmental Protection Agency (EPA) regulation 40 CFR 763 (Asbestos Hazard Emergency Response Act, AHERA). Suspect ACM samples were delivered to an accredited laboratory for analysis by Polarized Light Microscopy (PLM).

1.1 Project Objective

We understand the asbestos inspection was requested to identify and sample suspect ACM and provide information regarding the identity, location, condition, and approximate quantities of ACM in interior and exterior building components (including the roof) anticipated to be impacted by renovation activities. Please note that Terracon was not provided with renovation plans; however, it is expected that the gymnasium building roofs will be replaced, windows and doors will be replaced, and interior heating systems will be upgraded which could potentially penetrate surfaces within the gymnasium and adjacent spaces. EPA regulation 40 CFR 61, Subpart M, National Emission Standards for Hazardous Air Pollutants (NESHAP), prohibits the release of asbestos fibers to the atmosphere during renovation or demolition activities. The asbestos NESHAP requires that potentially regulated ACM be identified, classified, and quantified prior to planned disturbances or demolition activities. The Occupational Health and Safety Administration (OSHA) has promulgated worker protection standards for the disturbance of materials containing asbestos during demolition and renovation projects.

1.2 General Conditions and Limitations

The limited asbestos inspections encompassed the interior and exterior of the gymnasium buildings at each school. At the direction of Moore County Schools (Client), the roof system and associated materials were included in the scope of the inspection.

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The level of effort and associated tasks performed for this service was limited to the scope of services outlined in Terracon’s proposal. Terracon did not attempt to identify every potential exposure or hazard present in the building.

1.3 Reliance

This report is prepared for the exclusive use and reliance of the Client. Use or reliance by any other party is prohibited without the written authorization of the Client and Terracon.

Reliance on the report by the Client and all authorized parties will be subject to the terms, conditions and limitations stated in Terracon’s proposal and the Agreement for Services. The limitation of liability defined in the Agreement for Services is the aggregate limit of Terracon’s liability to the Client and all relying parties.

2.0 Building Descriptions

Sandhills Farm Life Elementary School is located at 2201 Farm Life School Road in Carthage, North Carolina, and the gymnasium building is approximately 11,000 square feet. The exterior is brick, and the roof is primarily a pitched asphalt-shingled roof with built-up roofs located over the front lobby and rear exit areas. Interior components consist of an open roof deck, block and brick walls, and wood and vinyl floor tile over concrete.

Carthage Elementary School is located at 312 Rockingham Street in Carthage, North Carolina, and the gymnasium building is approximately 11,000 square feet. The exterior is brick, and the roof consists of multi-level built-up roofs. Interior components consist of an open roof deck, block walls, and a wood floor over concrete.

Vass-Lakeview Elementary School is located at 141 James Street in Vass, North Carolina, and the gymnasium building is approximately 8,300 square feet. The exterior is brick, and the roof is primarily a pitched metal roof with a built-up roof located over the front lobby and a flat rubber roof on the soffit around the building. Interior components consist of an open roof deck with wood walls and a wood floor over concrete.

3.0 Field Activities

The inspection was conducted by Anthony Scialdone (State of North Carolina Accreditation Number 12284). A copy of his asbestos inspector certificate is attached as

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Appendix E. The inspection was conducted in general accordance with the sample collection protocols established in EPA regulation 40 CFR 763 (ASHERA). A summary of inspection activities is provided below.

3.1 Visual Assessment

Our inspection activities began with visual observation of the interior and exterior areas of the gymnasium buildings, including the roof, to identify homogeneous areas of suspect ACM that could be impacted by renovation activities. A homogeneous area consists of building materials that appear similar throughout in terms of color, texture, and date of application. The assessment was conducted throughout visually accessible areas of the buildings. Building materials identified as concrete, glass, wood, masonry, metal, or rubber were not considered suspect ACM.

3.2 Physical Assessment

A physical assessment of each homogeneous area of suspect ACM was conducted to assess the friability and condition of the materials. A friable material is defined by the EPA as a material, which can be crumbled, pulverized, or reduced to powder by hand pressure when dry. Friability was assessed by physically touching suspect materials.

3.3 Sample Collection

Based on the results of the visual observation, bulk samples of suspect ACM were collected in general accordance with ASHERA sampling protocols. Random samples of suspect materials were collected in each homogeneous area. Bulk samples were collected using wet methods as applicable to reduce the potential for fiber release. Samples were placed in sealable containers and labeled with unique sample numbers using an indelible marker. Terracon collected 109 bulk samples from 34 homogeneous areas of suspect ACM.

3.4 Sample Analysis

Bulk samples were submitted under chain of custody to Eurofins CEI (CEI) in Cary, North Carolina for analysis by PLM with dispersion staining techniques per EPA methodology (EPA Method 600/R-93/116). The percentage of asbestos, where applicable, was determined by microscopic visual estimation. CEI is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP Accreditation No. 101768-0). Terracon instructed the laboratory to utilize the 'positive stop' method where the laboratory would cease analyzing the rest of the samples in the homogeneous after the first sample was identified to contain greater than 1% asbestos.



4.0 Regulatory Overview

The following sections provide a general overview to the applicable asbestos regulations. Please refer to the complete current regulation in order to verify compliance before any actions are initiated on an ACM.

4.1 NESHAP

The asbestos NESHAP (40 CFR Part 61, Subpart M) regulates asbestos fiber emissions and asbestos waste disposal practices. It also requires the identification and classification of existing building materials prior to demolition or renovation activities. Under NESHAP, asbestos-containing building materials are classified as either friable, Category I non-friable, or Category II non-friable ACM. Friable materials are those that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure. Category I non-friable ACM includes packings, gaskets, resilient floor coverings, and asphalt roofing products containing more than 1% asbestos. Category II non-friable ACM are any materials other than Category I materials that contain more than 1% asbestos.

Friable ACM, and Category I and Category II non-friable ACM which are in poor condition and have become friable; will be subjected to drilling, sanding, grinding, cutting, or abrading; or could be crushed or pulverized during anticipated renovation or demolition activities are considered regulated ACM (RACM).

4.2 North Carolina State Regulations

In the state of North Carolina, asbestos activities are regulated by the North Carolina Department of Health and Human Services, Health Hazards Control Unit (HHCU) under 10A NCAC 41C Section .0600 – Asbestos Hazard Management Program (AHMP). The AHMP requires that any asbestos-related activity conducted in a public building be performed by personnel accredited by the HHCU.

Asbestos abatement must be conducted under the direct supervision of a North Carolina accredited supervisor, except permitted removals of roofing products may be conducted under the direct supervision of a North Carolina accredited roofing supervisor. An asbestos abatement design must be prepared by a North Carolina accredited abatement designer for each individually permitted removal of more than 3000 square feet (281 square meters), 1500 linear feet (462 meters), or 656 cubic feet (18 cubic meters) of regulated asbestos containing materials conducted in public areas. Third-party air monitoring must be conducted during the abatement activities in accordance with AHMP requirements.



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AHMP requires that no person remove more than 35 cubic feet (1 cubic meter), 160 square feet (15 square meters), or 260 linear feet (80 linear meters) of regulated asbestos-containing material, without a permit issued by the HHCU. Applications must be postmarked or received by the HHCU at least ten working days prior to the scheduled removal start date.

4.3 OSHA

OSHA's general industry asbestos standard (29 CFR 1910.1001) requires employers to exercise due diligence in complying with the requirements to inform their employees and affected contractors working in the facility about the presence and location of both ACM and materials assumed to contain asbestos.

The OSHA Asbestos standard for construction (29 CFR 1926.1101) regulates workplace exposure to asbestos during construction and maintenance activities. The standard classifies construction and maintenance activities that could disturb ACM and specifies work practices and precautions which employers must follow when engaging in each class of regulated work. States which administer their own federally approved state OSHA programs may require additional precautions.

A full copy of the OSHA asbestos standard for general and construction industry may be found at OSHA's website (www.osha.gov) and should be referenced for specific information.

5.0 Findings and Recommendations

Asbestos **was identified** at concentrations greater than 1% in the following materials:

Vass-Lakeview Elementary School

- White window caulk
- Gray door caulk
- White window glazing
- Gray window caulk
- Waterproofing mastic

Sandhills Farm Life Elementary School

- 12" x 12" Light Gray floor tile mastic

Carthage Elementary School

- White window caulk
- Black wall mastic

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If additional suspect materials are found during renovation activities, they should be assumed to contain asbestos until laboratory analysis can confirm or deny their asbestos content. Terracon recommends that the identified ACM be removed and disposed of by a North Carolina licensed asbestos abatement contractor prior to renovations. Please refer to Appendix A for additional information regarding the identified ACM. A summary of suspect materials sampled is provided in Appendix B. Laboratory analytical reports are provided in Appendix C. Photographs are provided in Appendix D.

6.0 General Comments

This asbestos inspection was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. The results, findings, conclusions, and recommendations expressed in this report are based on conditions observed during our inspection of the building.

This report has been prepared on behalf of and exclusively for use by Moore County Schools for specific application to their project as discussed. This report is not a bidding document. Contractors or consultants reviewing this report must draw their own conclusions regarding further investigation or remediation deemed necessary. Terracon does not warrant the work of regulatory agencies, laboratories, or other third parties supplying information, which may have been used in the preparation of this report. No warranty, expressed or implied is made.

Limited Asbestos Inspection Report

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APPENDIX A

MATERIALS CONTAINING ASBESTOS SUMMARY

Appendix A

MATERIALS CONTAINING ASBESTOS SUMMARY
Moore County Schools - Gymnasium Renovation Project
Sandhills Farm Life Elementary School, Carthage Elementary School, and Vass-Lakeview Elementary School
Moore County, North Carolina
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VASS-LAKEVIEW ELEMENTARY SCHOOL - MATERIALS CONTAINING GREATER THAN 1% ASBESTOS

| HA | Material Description | Material Location | Percent / Type Asbestos | NESHAP Classification | Condition | Estimated Quantity ¹ |
|----|----------------------|--------------------------|-------------------------|-----------------------|-----------|--|
| 6 | White Window Caulk | Exterior - Upper Windows | 2% Chrysotile | Category II | Poor | 48 Windows (4' x 3' windows) 200 Linear Feet |
| 8 | Gray Door Caulk | Exterior | 7% Chrysotile | Category II | Good | 2 Doors (40 Linear Feet) |
| 9 | White Window Glazing | Exterior - Lower Windows | 2% Chrysotile | Category II | Good | 10 Windows (3' x 2' windows) 100 Linear Feet |
| 10 | Gray Window Caulk | Exterior - Lower Windows | 7% Chrysotile | Category II | Good | 10 Windows (3' x 2' windows) 100 Linear Feet |
| 11 | Waterproofing Mastic | Exterior | 10% Chrysotile | Category II | Good | 10 Square Feet |

SANDHILLS FARM LIFE ELEMENTARY SCHOOL - MATERIALS CONTAINING GREATER THAN 1% ASBESTOS

| HA | Material Description | Material Location | Percent / Type Asbestos | NESHAP Classification | Condition | Estimated Quantity ¹ |
|----|--|-------------------|--------------------------------------|-----------------------|-----------|---------------------------------|
| 23 | 12" x 12" Light Gray Floor Tile Mastic | Gym | Tile - ND; Mastic - 3% Chrysotile | Category I | Good | 325 Square Feet |

CARTHAGE ELEMENTARY SCHOOL - MATERIALS CONTAINING GREATER THAN 1% ASBESTOS

| HA | Material Description | Material Location | Percent / Type Asbestos | NESHAP Classification | Condition | Estimated Quantity ¹ |
|----|----------------------|-------------------|-------------------------|-----------------------|-----------|--|
| 26 | White Window Caulk | Exterior | 3% Chrysotile | Category II | Good | 24 Windows (9' x 3' windows) 10 Windows (18' x 5' windows) 1,075 Linear Feet |
| 30 | Black Wall Mastic | Roof Elevations | 3% Chrysotile | Category II | Good | 100 Square Feet |

HA = Homogenous Area

¹ Quantities are estimates and should be verified by the asbestos contractor

Friable ACM includes those materials that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.

Category I Non-Friable ACM includes packings, gaskets, resilient floor coverings and asphalt roofing products containing more than 1% asbestos.

Category II Non-Friable ACM includes all other materials containing more than 1% asbestos and not otherwise identified as Category I Non-Friable ACM.

Limited Asbestos Inspection Report

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APPENDIX B

ASBESTOS INSPECTION SAMPLE SUMMARY

Appendix B

**ASBESTOS INSPECTION SAMPLE SUMMARY
 Moore County Schools - Gymnasium Renovation Project
 Sandhills Farm Life Elementary School, Carthage Elementary School, and Vass-Lakeview Elementary School
 Moore County, North Carolina
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| HA # | Sample # | Description | Sample Location | Lab Results |
|--|--------------|--------------------------------|---------------------------------|---------------------------------|
| Vass-Lakeview Elementary School | | | | |
| 1 | VL-01 | Gray Roof Mastic | Built-Up Roofs | ND |
| 1 | VL-02 | Gray Roof Mastic | Built-Up Roofs | ND |
| 1 | VL-03 | Gray Roof Mastic | Built-Up Roofs | ND |
| 2 | VL-04 | Built-Up Roofing | Built-Up Roofs | ND |
| 2 | VL-05 | Built-Up Roofing | Built-Up Roofs | ND |
| 2 | VL-06 | Built-Up Roofing | Built-Up Roofs | ND |
| 3 | VL-07 | Roofing Under Rubber Membrane | Membrane Roof | ND |
| 3 | VL-08 | Roofing Under Rubber Membrane | Membrane Roof | ND |
| 3 | VL-09 | Roofing Under Rubber Membrane | Membrane Roof | ND |
| 4 | VL-10 | Asphalt Roof Shingle/Tar Paper | Pitched Roof | Shingle - ND; Tar Paper - ND |
| 4 | VL-11 | Asphalt Roof Shingle/Tar Paper | Pitched Roof | Shingle - ND; Tar Paper - ND |
| 4 | VL-12 | Asphalt Roof Shingle/Tar Paper | Pitched Roof | Shingle - ND; Tar Paper - ND |
| 5 | VL-13 | Roof Flashing | Built-Up Roofs | ND |
| 5 | VL-14 | Roof Flashing | Built-Up Roofs | ND |
| 5 | VL-15 | Roof Flashing | Built-Up Roofs | ND |
| 6 | VL-16 | White Window Caulk | Exterior - Upper Windows | 2% Chrysotile |
| 6 | VL-17 | White Window Caulk | Exterior - Upper Windows | NA/PS |
| 6 | VL-18 | White Window Caulk | Exterior - Upper Windows | NA/PS |
| 7 | VL-19 | Gray Window Glazing | Exterior - Upper Windows | ND |
| 7 | VL-20 | Gray Window Glazing | Exterior - Upper Windows | ND |
| 7 | VL-21 | Gray Window Glazing | Exterior - Upper Windows | ND |
| 8 | VL-22 | Gray Door Caulk | Exterior | 7% Chrysotile |
| 8 | VL-23 | Gray Door Caulk | Exterior | NA/PS |
| 8 | VL-24 | Gray Door Caulk | Exterior | NA/PS |
| 9 | VL-25 | White Window Glazing | Exterior - Lower Windows | 2% Chrysotile |
| 9 | VL-26 | White Window Glazing | Exterior - Lower Windows | NA/PS |
| 9 | VL-27 | White Window Glazing | Exterior - Lower Windows | NA/PS |
| 10 | VL-28 | Gray Window Caulk | Exterior - Lower Windows | 7% Chrysotile |
| 10 | VL-29 | Gray Window Caulk | Exterior - Lower Windows | NA/PS |
| 10 | VL-30 | Gray Window Caulk | Exterior - Lower Windows | NA/PS |
| 11 | VL-31 | Waterproofing Mastic | Exterior | 10% Chrysotile |
| 11 | VL-32 | Waterproofing Mastic | Exterior | NA/PS |
| 11 | VL-33 | Waterproofing Mastic | Exterior | NA/PS |
| Sandhills Farm Life Elementary School | | | | |
| 12 | SFL-01 | Built-Up Roofing | Built-Up Roofs | ND |
| 12 | SFL-02 | Built-Up Roofing | Built-Up Roofs | ND |
| 12 | SFL-03 | Built-Up Roofing | Built-Up Roofs | ND |
| 13 | SFL-04 | Asphalt Roof Shingle/Tar Paper | Pitched Roof | Shingle - ND; Tar Paper - ND |
| 13 | SFL-05 | Asphalt Roof Shingle/Tar Paper | Pitched Roof | Shingle - ND; Tar Paper - ND |

Appendix B

ASBESTOS INSPECTION SAMPLE SUMMARY

Moore County Schools - Gymnasium Renovation Project

**Sandhills Farm Life Elementary School, Carthage Elementary School, and Vass-Lakeview Elementary School
Moore County, North Carolina
Terracon Project No. 70237323**

| HA # | Sample # | Description | Sample Location | Lab Results |
|-----------------------------------|---------------|---|--------------------------|--|
| 13 | SFL-06 | Asphalt Roof Shingle/Tar Paper | Pitched Roof | Shingle - ND; Tar Paper - ND |
| 14 | SFL-07 | Gray Window Caulk | Exterior - Upper Windows | ND |
| 14 | SFL-08 | Gray Window Caulk | Exterior - Upper Windows | ND |
| 14 | SFL-09 | Gray Window Caulk | Exterior - Upper Windows | ND |
| 15 | SFL-10 | White Window Glazing | Exterior - Upper Windows | ND |
| 15 | SFL-11 | White Window Glazing | Exterior - Upper Windows | ND |
| 15 | SFL-12 | White Window Glazing | Exterior - Upper Windows | ND |
| 16 | SFL-13 | Black Wall Mastic | Roof Elevations | ND |
| 16 | SFL-14 | Black Wall Mastic | Roof Elevations | ND |
| 16 | SFL-15 | Black Wall Mastic | Roof Elevations | ND |
| 17 | SFL-16 | Silver Paint/Roof Flashing | Built-Up Roofs | Paint - ND; Flashing - ND |
| 17 | SFL-17 | Silver Paint/Roof Flashing | Built-Up Roofs | Paint - ND; Flashing - ND |
| 17 | SFL-18 | Silver Paint/Roof Flashing | Built-Up Roofs | Paint - ND; Flashing - ND |
| 18 | SFL-19 | White Window Caulk | Side Windows/Panels | ND |
| 18 | SFL-20 | White Window Caulk | Side Windows/Panels | ND |
| 18 | SFL-21 | White Window Caulk | Side Windows/Panels | ND |
| 19 | SFL-22 | Stucco Window Panels | Side Windows/Panels | White Layer - ND; Gray Layer - ND |
| 19 | SFL-23 | Stucco Window Panels | Side Windows/Panels | White Layer - ND; Gray Layer - ND |
| 19 | SFL-24 | Stucco Window Panels | Side Windows/Panels | White Layer - ND; Gray Layer - ND |
| 20 | SFL-25 | White Door Caulk | Exterior | ND |
| 20 | SFL-26 | White Door Caulk | Exterior | ND |
| 20 | SFL-27 | White Door Caulk | Exterior | ND |
| 21 | SFL-28 | Gray Window Caulk | End Windows | ND |
| 21 | SFL-29 | Gray Window Caulk | End Windows | ND |
| 21 | SFL-30 | Gray Window Caulk | End Windows | ND |
| 22 | SFL-31 | CMU Block Coating | Gymnasium | ND |
| 22 | SFL-32 | CMU Block Coating | Gymnasium | ND |
| 22 | SFL-33 | CMU Block Coating | Gymnasium | ND |
| 22 | SFL-34 | CMU Block Coating | Gymnasium | ND |
| 22 | SFL-35 | CMU Block Coating | Gymnasium | ND |
| 22 | SFL-36 | CMU Block Coating | Gymnasium | ND |
| 22 | SFL-37 | CMU Block Coating | Gymnasium | ND |
| 23 | SFL-38 | 12" x 12" Light Gray Floor Tile/Mastic | Gymnasium | Tile - ND; Mastic - 3% Chrysotile |
| 23 | SFL-39 | 12" x 12" Light Gray Floor Tile/Mastic | Gymnasium | Tile - ND; Mastic - NA/PS |
| 23 | SFL-40 | 12" x 12" Light Gray Floor Tile/Mastic | Gymnasium | Tile - ND; Mastic - NA/PS |
| Carthage Elementary School | | | | |
| 24 | CE-01 | Built-Up Roofing | Roof | ND |

Appendix B

ASBESTOS INSPECTION SAMPLE SUMMARY
Moore County Schools - Gymnasium Renovation Project
Sandhills Farm Life Elementary School, Carthage Elementary School, and Vass-Lakeview Elementary School
Moore County, North Carolina
Terracon Project No. 70237323

| HA # | Sample # | Description | Sample Location | Lab Results |
|-----------|--------------|---------------------------|------------------------|----------------------|
| 24 | CE-02 | Built-Up Roofing | Roof | ND |
| 24 | CE-03 | Built-Up Roofing | Roof | ND |
| 25 | CE-04 | Gray Roof Mastic | Roof | ND |
| 25 | CE-05 | Gray Roof Mastic | Roof | ND |
| 25 | CE-06 | Gray Roof Mastic | Roof | ND |
| 26 | CE-07 | White Window Caulk | Exterior | 3% Chrysotile |
| 26 | CE-08 | White Window Caulk | Exterior | NA/PS |
| 26 | CE-09 | White Window Caulk | Exterior | NA/PS |
| 27 | CE-10 | White Window Glazing | Exterior | ND |
| 27 | CE-11 | White Window Glazing | Exterior | ND |
| 27 | CE-12 | White Window Glazing | Exterior | ND |
| 28 | CE-13 | Gray Door Caulk | Exterior | ND |
| 28 | CE-14 | Gray Door Caulk | Exterior | ND |
| 28 | CE-15 | Gray Door Caulk | Exterior | ND |
| 29 | CE-16 | White Door Caulk Residue | Exterior - Boiler Room | ND |
| 29 | CE-17 | White Door Caulk Residue | Exterior - Boiler Room | ND |
| 30 | CE-18 | Black Wall Mastic | Roof Elevations | 3% Chrysotile |
| 30 | CE-19 | Black Wall Mastic | Roof Elevations | NA/PS |
| 30 | CE-20 | Black Wall Mastic | Roof Elevations | NA/PS |
| 31 | CE-21 | Roof Flashing | Built-Up Roofs | ND |
| 31 | CE-22 | Roof Flashing | Built-Up Roofs | ND |
| 31 | CE-23 | Roof Flashing | Built-Up Roofs | ND |
| 32 | CE-24 | Tan Roof Caulk | Roof Elevations | ND |
| 32 | CE-25 | Tan Roof Caulk | Roof Elevations | ND |
| 32 | CE-26 | Tan Roof Caulk | Roof Elevations | ND |
| 33 | CE-27 | CMU Block Coating | Gymnasium | ND |
| 33 | CE-28 | CMU Block Coating | Gymnasium | ND |
| 33 | CE-29 | CMU Block Coating | Gymnasium | ND |
| 33 | CE-30 | CMU Block Coating | Gymnasium | ND |
| 33 | CE-31 | CMU Block Coating | Gymnasium | ND |
| 33 | CE-32 | CMU Block Coating | Gymnasium | ND |
| 33 | CE-33 | CMU Block Coating | Gymnasium | ND |
| 34 | CE-34 | Interior Window Glazing | Gymnasium | ND |
| 34 | CE-35 | Interior Window Glazing | Gymnasium | ND |
| 34 | CE-36 | Interior Window Glazing | Gymnasium | ND |

ND = None Detected

HA = Homogeneous Area

NA/PS = Not Analyzed/Positive Stop

Bold font = Material containing <1% asbestos

Bold font and shaded = NESHAP asbestos-containing material

Limited Asbestos Inspection Report

Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina

July 6, 2023 | Terracon Project No. 70237323



APPENDIX C

ASBESTOS LABORATORY ANALYTICAL REPORT



July 3, 2023

Terracon Consultants, Inc.
2401 Brentwood Road, Suite 107
Raleigh, NC 27604

CLIENT PROJECT: Moore County Schools
CEI LAB CODE: B2313882

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on June 28, 2023. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations.

Kind Regards,

A handwritten signature in black ink, appearing to read "Tianbao Bai".

Tianbao Bai, Ph.D., CIH
Laboratory Director





ASBESTOS ANALYTICAL REPORT
By: Polarized Light Microscopy

Prepared for

Terracon Consultants, Inc.

CLIENT PROJECT: Moore County Schools

LAB CODE: B2313882

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 07/03/23

TOTAL SAMPLES ANALYZED: 95

SAMPLES >1% ASBESTOS: 8

730 SE Maynard Road • Cary, NC 27511 • 919.481.1413



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Moore County Schools

LAB CODE: B2313882

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

| Client ID | Layer | Lab ID | Color | Sample Description | ASBESTOS % |
|-----------|---------|--------------|----------------|-----------------------------|---------------|
| VL-01 | | B2313882.001 | Gray,Black | Roof Mastic | None Detected |
| VL-02 | | B2313882.002 | Gray,Black | Roof Mastic | None Detected |
| VL-03 | | B2313882.003 | Gray,Black | Roof Mastic | None Detected |
| VL-04 | | B2313882.004 | Brown,Black | Built-Up Roofing | None Detected |
| VL-05 | | B2313882.005 | Brown,Black | Built-Up Roofing | None Detected |
| VL-06 | | B2313882.006 | Brown,Black | Built-Up Roofing | None Detected |
| VL-07 | | B2313882.007 | Black | Roofing Under Roof Membrane | None Detected |
| VL-08 | | B2313882.008 | Black | Roofing Under Roof Membrane | None Detected |
| VL-09 | | B2313882.009 | Black | Roofing Under Roof Membrane | None Detected |
| VL-10 | Layer 1 | B2313882.010 | Black,Brown | Asphalt Roof Shingle | None Detected |
| VL-10 | Layer 2 | B2313882.010 | Black,Brown | Tar Paper | None Detected |
| VL-11 | Layer 1 | B2313882.011 | Black,Brown | Asphalt Roof Shingle | None Detected |
| VL-11 | Layer 2 | B2313882.011 | Black,Brown | Tar Paper | None Detected |
| VL-12 | Layer 1 | B2313882.012 | Black,Brown | Asphalt Roof Shingle | None Detected |
| VL-12 | Layer 2 | B2313882.012 | Black,Brown | Tar Paper | None Detected |
| VL-13 | | B2313882.013 | Black,Brown | Roof Flashing | None Detected |
| VL-14 | | B2313882.014 | Black,Brown | Roof Flashing | None Detected |
| VL-15 | | B2313882.015 | Black,Brown | Roof Flashing | None Detected |
| VL-16 | | B2313882.016 | White,Gray | Window Caulking | Chrysotile 2% |
| VL-17 | | B2313882.017 | | Sample Not Analyzed per COC | |
| VL-18 | | B2313882.018 | | Sample Not Analyzed per COC | |
| VL-19 | | B2313882.019 | Gray,Off-white | Window Glazing | None Detected |
| VL-20 | | B2313882.020 | Gray,Off-white | Window Glazing | None Detected |
| VL-21 | | B2313882.021 | Gray,Off-white | Window Glazing | None Detected |
| VL-22 | | B2313882.022 | Gray | Door Caulk | Chrysotile 7% |
| VL-23 | | B2313882.023 | | Sample Not Analyzed per COC | |
| VL-24 | | B2313882.024 | | Sample Not Analyzed per COC | |
| VL-25 | | B2313882.025 | Gray,Off-white | Window Glazing | Chrysotile 2% |
| VL-26 | | B2313882.026 | | Sample Not Analyzed per COC | |
| VL-27 | | B2313882.027 | | Sample Not Analyzed per COC | |
| VL-28 | | B2313882.028 | Gray,Off-white | Window Caulking | Chrysotile 7% |



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Moore County Schools

LAB CODE: B2313882

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

| Client ID | Layer | Lab ID | Color | Sample Description | ASBESTOS % |
|-----------|---------|--------------|-----------------|-----------------------------|-----------------------|
| VL-29 | | B2313882.029 | | Sample Not Analyzed per COC | |
| VL-30 | | B2313882.030 | | Sample Not Analyzed per COC | |
| VL-31 | | B2313882.031 | Gray,Black | Waterproofing Mastic | Chrysotile 10% |
| VL-32 | | B2313882.032 | | Sample Not Analyzed per COC | |
| VL-33 | | B2313882.033 | | Sample Not Analyzed per COC | |
| SFL-01 | | B2313882.034 | Black | Built-Up Roofing | None Detected |
| SFL-02 | | B2313882.035 | Black | Built-Up Roofing | None Detected |
| SFL-03 | | B2313882.036 | Black | Built-Up Roofing | None Detected |
| SFL-04 | Layer 1 | B2313882.037 | Black,Brown | Asphalt Roof Shingle | None Detected |
| SFL-04 | Layer 2 | B2313882.037 | Black | Tar Paper | None Detected |
| SFL-05 | Layer 1 | B2313882.038 | Black,Brown | Asphalt Roof Shingle | None Detected |
| SFL-05 | Layer 2 | B2313882.038 | Black | Tar Paper | None Detected |
| SFL-06 | Layer 1 | B2313882.039 | Black,Brown | Asphalt Roof Shingle | None Detected |
| SFL-06 | Layer 2 | B2313882.039 | Black | Tar Paper | None Detected |
| SFL-07 | | B2313882.040 | Gray,Off-white | Window Caulking | None Detected |
| SFL-08 | | B2313882.041 | Gray,Off-white | Window Caulking | None Detected |
| SFL-09 | | B2313882.042 | Gray,Off-white | Window Caulking | None Detected |
| SFL-10 | | B2313882.043 | White,Off-white | Window Glazing | None Detected |
| SFL-11 | | B2313882.044 | White,Off-white | Window Glazing | None Detected |
| SFL-12 | | B2313882.045 | White,Off-white | Window Glazing | None Detected |
| SFL-13 | | B2313882.046 | Black | Wall Mastic | None Detected |
| SFL-14 | | B2313882.047 | Black | Wall Mastic | None Detected |
| SFL-15 | | B2313882.048 | Black | Wall Mastic | None Detected |
| SFL-16 | Layer 1 | B2313882.049 | Silver | Roof Flashing-silver Paint | None Detected |
| SFL-16 | Layer 2 | B2313882.049 | Black,Brown | Roof Flashing-tar | None Detected |
| SFL-17 | Layer 1 | B2313882.050 | Silver | Roof Flashing-silver Paint | None Detected |
| SFL-17 | Layer 2 | B2313882.050 | Black,Brown | Roof Flashing-tar | None Detected |
| SFL-18 | Layer 1 | B2313882.051 | Silver | Roof Flashing-silver Paint | None Detected |
| SFL-18 | Layer 2 | B2313882.051 | Black,Brown | Roof Flashing-tar | None Detected |
| SFL-19 | | B2313882.052 | White,Off-white | Window Caulking | None Detected |
| SFL-20 | | B2313882.053 | White,Off-white | Window Caulking | None Detected |



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Moore County Schools

LAB CODE: B2313882

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

| Client ID | Layer | Lab ID | Color | Sample Description | ASBESTOS % |
|-----------|---------|---------------|-----------------|-----------------------------|----------------------|
| SFL-21 | | B2313882.054 | White,Off-white | Window Caulking | None Detected |
| SFL-22 | Layer 1 | B2313882.055 | White,Off-white | Stucco Window Panels | None Detected |
| SFL-22 | Layer 2 | B2313882.055 | Gray | Stucco Window Panels | None Detected |
| SFL-23 | Layer 1 | B2313882.056 | White,Off-white | Stucco Window Panels | None Detected |
| SFL-23 | Layer 2 | B2313882.056 | Gray | Stucco Window Panels | None Detected |
| SFL-24 | Layer 1 | B2313882.057 | White,Off-white | Stucco Window Panels | None Detected |
| SFL-24 | Layer 2 | B2313882.057 | Gray | Stucco Window Panels | None Detected |
| SFL-25 | | B2313882.058 | White,Gray | Door Caulk | None Detected |
| SFL-26 | | B2313882.059 | White,Gray | Door Caulk | None Detected |
| SFL-27 | | B2313882.060 | White,Gray | Door Caulk | None Detected |
| SFL-28 | | B2313882.061 | Gray | Window Caulking | None Detected |
| SFL-29 | | B2313882.062 | Gray | Window Caulking | None Detected |
| SFL-30 | | B2313882.063 | Gray | Window Caulking | None Detected |
| SFL-31 | | B2313882.064 | Yellow,White | Cmu Block Coating | None Detected |
| SFL-32 | | B2313882.065 | Cream,White | Cmu Block Coating | None Detected |
| SFL-33 | | B2313882.066 | Blue,White | Cmu Block Coating | None Detected |
| SFL-34 | | B2313882.067 | Yellow,White | Cmu Block Coating | None Detected |
| SFL-35 | | B2313882.068 | Yellow,White | Cmu Block Coating | None Detected |
| SFL-36 | | B2313882.069 | Yellow,White | Cmu Block Coating | None Detected |
| SFL-37 | | B2313882.070 | Yellow,White | Cmu Block Coating | None Detected |
| SFL-38 | | B2313882.071A | Light Gray | Floor Tile | None Detected |
| | | B2313882.071B | Black | Mastic | Chrysotile 3% |
| SFL-39 | | B2313882.072A | Light Gray | Floor Tile | None Detected |
| | | B2313882.072B | | Sample Not Analyzed per COC | |
| SFL-40 | | B2313882.073A | Light Gray | Floor Tile | None Detected |
| | | B2313882.073B | | Sample Not Analyzed per COC | |
| CE-01 | | B2313882.074 | Black,Brown | Built-Up Roofing | None Detected |
| CE-02 | | B2313882.075 | Black,Brown | Built-Up Roofing | None Detected |
| CE-03 | | B2313882.076 | Black,Brown | Built-Up Roofing | None Detected |
| CE-04 | | B2313882.077 | Black,Gray | Roof Mastic | None Detected |
| CE-05 | | B2313882.078 | Black,Gray | Roof Mastic | None Detected |



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Moore County Schools

LAB CODE: B2313882

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

| Client ID | Layer | Lab ID | Color | Sample Description | ASBESTOS % |
|-----------|-------|--------------|----------------------|-----------------------------|----------------------|
| CE-06 | | B2313882.079 | Black,Gray | Roof Mastic | None Detected |
| CE-07 | | B2313882.080 | White,Off-white | Window Caulking | Chrysotile 3% |
| CE-08 | | B2313882.081 | | Sample Not Analyzed per COC | |
| CE-09 | | B2313882.082 | | Sample Not Analyzed per COC | |
| CE-10 | | B2313882.083 | White,Off-white | Window Glazing | None Detected |
| CE-11 | | B2313882.084 | White,Off-white | Window Glazing | None Detected |
| CE-12 | | B2313882.085 | White,Off-white | Window Glazing | None Detected |
| CE-13 | | B2313882.086 | Gray,Off-white | Door Caulk | None Detected |
| CE-14 | | B2313882.087 | Gray,Off-white | Door Caulk | None Detected |
| CE-15 | | B2313882.088 | Gray,Off-white | Door Caulk | None Detected |
| CE-16 | | B2313882.089 | Off-white,Light Gray | Door Caulk Residue | None Detected |
| CE-17 | | B2313882.090 | Off-white,Light Gray | Door Caulk Residue | None Detected |
| CE-18 | | B2313882.091 | Black,Light Gray | Wall Mastic | Chrysotile 3% |
| CE-19 | | B2313882.092 | | Sample Not Analyzed per COC | |
| CE-20 | | B2313882.093 | | Sample Not Analyzed per COC | |
| CE-21 | | B2313882.094 | Silver,Black | Roof Flashing | None Detected |
| CE-22 | | B2313882.095 | Silver,Black | Roof Flashing | None Detected |
| CE-23 | | B2313882.096 | Silver,Black | Roof Flashing | None Detected |
| CE-24 | | B2313882.097 | Tan,Off-white | Roof Caulking | None Detected |
| CE-25 | | B2313882.098 | Tan,Off-white | Roof Caulking | None Detected |
| CE-26 | | B2313882.099 | Tan,Off-white | Roof Caulking | None Detected |
| CE-27 | | B2313882.100 | White,Off-white | Cmu Block Coating | None Detected |
| CE-28 | | B2313882.101 | White,Off-white | Cmu Block Coating | None Detected |
| CE-29 | | B2313882.102 | White,Off-white | Cmu Block Coating | None Detected |
| CE-30 | | B2313882.103 | White,Off-white | Cmu Block Coating | None Detected |
| CE-31 | | B2313882.104 | White,Off-white | Cmu Block Coating | None Detected |
| CE-32 | | B2313882.105 | Green,Off-white | Cmu Block Coating | None Detected |
| CE-33 | | B2313882.106 | White,Off-white | Cmu Block Coating | None Detected |
| CE-34 | | B2313882.107 | White,Off-white | Interior Window Glazing | None Detected |



Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Moore County Schools

LAB CODE: B2313882

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

| Client ID | Layer | Lab ID | Color | Sample Description | ASBESTOS % |
|-----------|-------|--------------|-----------------|-------------------------|---------------|
| CE-35 | | B2313882.108 | White,Off-white | Interior Window Glazing | None Detected |
| CE-36 | | B2313882.109 | White,Off-white | Interior Window Glazing | None Detected |



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Terracon Consultants, Inc.
 2401 Brentwood Road, Suite 107
 Raleigh, NC 27604

Lab Code: B2313882
Date Received: 06-28-23
Date Analyzed: 07-03-23
Date Reported: 07-03-23

Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | ASBESTOS % | |
|---|--------------------------------|--|-------------------------|-----------------|-----|---------------|---------------|
| | | | Fibrous | Non-Fibrous | | | |
| VL-01 B2313882.001 | Roof Mastic | Homogeneous Gray,Black Fibrous Bound | 65% | Cellulose | 35% | Tar | None Detected |
| Samples B2313882.001-B2313882.063 analyzed by S.Nicolella | | | | | | | |
| VL-02 B2313882.002 | Roof Mastic | Homogeneous Gray,Black Fibrous Bound | 65% | Cellulose | 35% | Tar | None Detected |
| VL-03 B2313882.003 | Roof Mastic | Homogeneous Gray,Black Fibrous Bound | 65% | Cellulose | 35% | Tar | None Detected |
| VL-04 B2313882.004 | Built-Up Roofing | Heterogeneous Brown,Black Fibrous Bound | 35% | Cellulose | 30% | Tar | None Detected |
| VL-05 B2313882.005 | Built-Up Roofing | Heterogeneous Brown,Black Fibrous Bound | 35% | Cellulose | 30% | Tar | None Detected |
| VL-06 B2313882.006 | Built-Up Roofing | Heterogeneous Brown,Black Fibrous Bound | 35% | Cellulose | 30% | Tar | None Detected |
| VL-07 B2313882.007 | Roofing Under Roof Membrane | Heterogeneous Black Fibrous Bound | 15% | Cellulose | 30% | Tar | None Detected |
| | | | 50% | Synthetic Fiber | 5% | Gravel | |



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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|----------------------------------|--------------------------------|--|-------------------------|-----------------|-------------|--------|---------------|
| | | | Fibrous | | Non-Fibrous | | |
| VL-08 B2313882.008 | Roofing Under Roof Membrane | Heterogeneous Black Fibrous Bound | 15% | Cellulose | 30% | Tar | None Detected |
| | | | 50% | Synthetic Fiber | 5% | Gravel | |
| VL-09 B2313882.009 | Roofing Under Roof Membrane | Heterogeneous Black Fibrous Bound | 15% | Cellulose | 30% | Tar | None Detected |
| | | | 50% | Synthetic Fiber | 5% | Gravel | |
| VL-10 Layer 1 B2313882.010 | Asphalt Roof Shingle | Heterogeneous Black,Brown Fibrous Bound | <1% | Cellulose | 40% | Tar | None Detected |
| | | | 50% | Fiberglass | 10% | Gravel | |
| VL-10 Layer 2 B2313882.010 | Tar Paper | Heterogeneous Black,Brown Fibrous Bound | <1% | Cellulose | 30% | Tar | None Detected |
| | | | 70% | Fiberglass | | | |
| VL-11 Layer 1 B2313882.011 | Asphalt Roof Shingle | Heterogeneous Black,Brown Fibrous Bound | <1% | Cellulose | 40% | Tar | None Detected |
| | | | 50% | Fiberglass | 10% | Gravel | |
| VL-11 Layer 2 B2313882.011 | Tar Paper | Heterogeneous Black,Brown Fibrous Bound | <1% | Cellulose | 30% | Tar | None Detected |
| | | | 70% | Fiberglass | | | |
| VL-12 Layer 1 B2313882.012 | Asphalt Roof Shingle | Heterogeneous Black,Brown Fibrous Bound | <1% | Cellulose | 40% | Tar | None Detected |
| | | | 50% | Fiberglass | 10% | Gravel | |



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Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | ASBESTOS % | |
|----------------------------------|-----------------------------|-------------------|-------------------------|-------------|-----|---------------|---------------|
| | | | Fibrous | Non-Fibrous | | | |
| VL-12 Layer 2 B2313882.012 | Tar Paper | Heterogeneous | <1% | Cellulose | 30% | Tar | None Detected |
| | | Black,Brown | 70% | Fiberglass | | | |
| | | Fibrous | | | | | |
| | | Bound | | | | | |
| VL-13 B2313882.013 | Roof Flashing | Heterogeneous | 20% | Cellulose | 30% | Tar | None Detected |
| | | Black,Brown | 50% | Fiberglass | | | |
| | | Fibrous | | | | | |
| | | Bound | | | | | |
| VL-14 B2313882.014 | Roof Flashing | Heterogeneous | 20% | Cellulose | 30% | Tar | None Detected |
| | | Black,Brown | 50% | Fiberglass | | | |
| | | Fibrous | | | | | |
| | | Bound | | | | | |
| VL-15 B2313882.015 | Roof Flashing | Heterogeneous | 20% | Cellulose | 30% | Tar | None Detected |
| | | Black,Brown | 50% | Fiberglass | | | |
| | | Fibrous | | | | | |
| | | Bound | | | | | |
| VL-16 B2313882.016 | Window Caulking | Heterogeneous | <1% | Cellulose | 5% | Paint | 2% Chrysotile |
| | | White,Gray | 10% | Talc | 68% | Binder | |
| | | Fibrous | | | 15% | Silicates | |
| | | Bound | | | | | |
| VL-17 B2313882.017 | Sample Not Analyzed per COC | | | | | | |
| VL-18 B2313882.018 | Sample Not Analyzed per COC | | | | | | |
| VL-19 B2313882.019 | Window Glazing | Heterogeneous | <1% | Cellulose | 5% | Paint | None Detected |
| | | Gray,Off-white | 3% | Talc | 77% | Binder | |
| | | Fibrous | | | 15% | Silicates | |
| | | Bound | | | | | |



ASBESTOS BULK ANALYSIS

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Date Received: 06-28-23
Date Analyzed: 07-03-23
Date Reported: 07-03-23

Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|-----------------------|-----------------------------|-------------------|-------------------------|-----------|-------------|-----------|---------------|
| | | | Fibrous | | Non-Fibrous | | |
| VL-20 B2313882.020 | Window Glazing | Heterogeneous | <1% | Cellulose | 5% | Paint | None Detected |
| | | Gray,Off-white | 3% | Talc | 77% | Binder | |
| | | Fibrous | | | 15% | Silicates | |
| | | Bound | | | | | |
| VL-21 B2313882.021 | Window Glazing | Heterogeneous | <1% | Cellulose | 5% | Paint | None Detected |
| | | Gray,Off-white | | | 95% | Caulk | |
| | | Fibrous | | | | | |
| | | Bound | | | | | |
| VL-22 B2313882.022 | Door Caulk | Heterogeneous | <1% | Cellulose | 5% | Paint | 7% Chrysotile |
| | | Gray | | | 73% | Binder | |
| | | Non-fibrous | | | 15% | Silicates | |
| | | Bound | | | | | |
| VL-23 B2313882.023 | Sample Not Analyzed per COC | | | | | | |
| VL-24 B2313882.024 | Sample Not Analyzed per COC | | | | | | |
| VL-25 B2313882.025 | Window Glazing | Heterogeneous | <1% | Cellulose | 5% | Paint | 2% Chrysotile |
| | | Gray,Off-white | | | 78% | Binder | |
| | | Non-fibrous | | | 15% | Silicates | |
| | | Bound | | | | | |
| VL-26 B2313882.026 | Sample Not Analyzed per COC | | | | | | |
| VL-27 B2313882.027 | Sample Not Analyzed per COC | | | | | | |
| VL-28 B2313882.028 | Window Caulking | Heterogeneous | <1% | Cellulose | 5% | Paint | 7% Chrysotile |
| | | Gray,Off-white | | | 73% | Binder | |
| | | Non-fibrous | | | 15% | Silicates | |
| | | Bound | | | | | |
| VL-29 B2313882.029 | Sample Not Analyzed per COC | | | | | | |



ASBESTOS BULK ANALYSIS

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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|--|--------------------------------|--|-------------------------|-------------------------|-------------|---------------|-----------------------|
| | | | Fibrous | | Non-Fibrous | | |
| VL-30 B2313882.030 | Sample Not Analyzed per COC | | | | | | |
| VL-31 B2313882.031 | Waterproofing Mastic | Heterogeneous Gray,Black Fibrous Bound | 10% | Cellulose | 80% | Tar | 10% Chrysotile |
| VL-32 B2313882.032 | Sample Not Analyzed per COC | | | | | | |
| VL-33 B2313882.033 | Sample Not Analyzed per COC | | | | | | |
| SFL-01 B2313882.034 | Built-Up Roofing | Heterogeneous Black Fibrous Bound | 10% 50% | Cellulose Fiberglass | 40% | Tar | None Detected |
| SFL-02 B2313882.035 | Built-Up Roofing | Heterogeneous Black Fibrous Bound | 10% 50% | Cellulose Fiberglass | 40% | Tar | None Detected |
| SFL-03 B2313882.036 | Built-Up Roofing | Heterogeneous Black Fibrous Bound | 10% 50% | Cellulose Fiberglass | 40% | Tar | None Detected |
| SFL-04 Layer 1 B2313882.037 | Asphalt Roof Shingle | Heterogeneous Black,Brown Fibrous Bound | <1% 50% | Cellulose Fiberglass | 40% 10% | Tar Gravel | None Detected |
| SFL-04 Layer 2 B2313882.037 | Tar Paper | Heterogeneous Black Fibrous Bound | <1% 70% | Cellulose Fiberglass | 30% | Tar | None Detected |



ASBESTOS BULK ANALYSIS

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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|-----------------------------------|----------------------|------------------------------------|-------------------------|------------|-------------|--------|---------------|
| | | | Fibrous | Cellulose | Non-Fibrous | Tar | |
| SFL-05 Layer 1 B2313882.038 | Asphalt Roof Shingle | Heterogeneous | <1% | Cellulose | 40% | Tar | None Detected |
| | | Black,Brown Fibrous Bound | 50% | Fiberglass | 10% | Gravel | |
| SFL-05 Layer 2 B2313882.038 | Tar Paper | Heterogeneous | <1% | Cellulose | 30% | Tar | None Detected |
| | | Black Fibrous Bound | 70% | Fiberglass | | | |
| SFL-06 Layer 1 B2313882.039 | Asphalt Roof Shingle | Heterogeneous | <1% | Cellulose | 40% | Tar | None Detected |
| | | Black,Brown Fibrous Bound | 50% | Fiberglass | 10% | Gravel | |
| SFL-06 Layer 2 B2313882.039 | Tar Paper | Heterogeneous | <1% | Cellulose | 30% | Tar | None Detected |
| | | Black Fibrous Bound | 70% | Fiberglass | | | |
| SFL-07 B2313882.040 | Window Caulking | Heterogeneous | 65% | Cellulose | 30% | Binder | None Detected |
| | | Gray,Off-white Fibrous Bound | | | 5% | Paint | |
| SFL-08 B2313882.041 | Window Caulking | Heterogeneous | 65% | Cellulose | 30% | Binder | None Detected |
| | | Gray,Off-white Fibrous Bound | | | 5% | Paint | |
| SFL-09 B2313882.042 | Window Caulking | Heterogeneous | 65% | Cellulose | 30% | Binder | None Detected |
| | | Gray,Off-white Fibrous Bound | | | 5% | Paint | |



ASBESTOS BULK ANALYSIS

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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|--|-------------------------------|---|-------------------------|-----------|-------------|----------------|---------------|
| | | | Fibrous | | Non-Fibrous | | |
| SFL-10 B2313882.043 | Window Glazing | Heterogeneous White, Off-white Non-fibrous Bound | 5% | Cellulose | 90% | Caulk Paint | None Detected |
| SFL-11 B2313882.044 | Window Glazing | Heterogeneous White, Off-white Non-fibrous Bound | 5% | Cellulose | 90% | Caulk Paint | None Detected |
| SFL-12 B2313882.045 | Window Glazing | Heterogeneous White, Off-white Non-fibrous Bound | 5% | Cellulose | 90% | Caulk Paint | None Detected |
| SFL-13 B2313882.046 | Wall Mastic | Homogeneous Black Non-fibrous Bound | 5% | Cellulose | 95% | Mastic | None Detected |
| SFL-14 B2313882.047 | Wall Mastic | Homogeneous Black Non-fibrous Bound | 5% | Cellulose | 95% | Mastic | None Detected |
| SFL-15 B2313882.048 | Wall Mastic | Homogeneous Black Non-fibrous Bound | 5% | Cellulose | 95% | Mastic | None Detected |
| SFL-16 Layer 1 B2313882.049 | Roof Flashing-silver Paint | Homogeneous Silver Non-fibrous Bound | 5% | Cellulose | 95% | Paint | None Detected |



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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | ASBESTOS % |
|-----------------------------------|-------------------------------|--|-------------------------|-------------|-----------|---------------|
| | | | Fibrous | Non-Fibrous | | |
| SFL-16 Layer 2 B2313882.049 | Roof Flashing-tar | Homogeneous Black,Brown Fibrous Bound | 15% | Cellulose | 85% Tar | None Detected |
| SFL-17 Layer 1 B2313882.050 | Roof Flashing-silver Paint | Homogeneous Silver Non-fibrous Bound | 5% | Cellulose | 95% Paint | None Detected |
| SFL-17 Layer 2 B2313882.050 | Roof Flashing-tar | Homogeneous Black,Brown Fibrous Bound | 15% | Cellulose | 85% Tar | None Detected |
| SFL-18 Layer 1 B2313882.051 | Roof Flashing-silver Paint | Homogeneous Silver Non-fibrous Bound | 5% | Cellulose | 95% Paint | None Detected |
| SFL-18 Layer 2 B2313882.051 | Roof Flashing-tar | Homogeneous Black,Brown Fibrous Bound | 15% | Cellulose | 85% Tar | None Detected |
| SFL-19 B2313882.052 | Window Caulking | Homogeneous White,Off-white Non-fibrous Bound | 5% | Cellulose | 95% Caulk | None Detected |
| SFL-20 B2313882.053 | Window Caulking | Homogeneous White,Off-white Non-fibrous Bound | 5% | Cellulose | 95% Caulk | None Detected |



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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | ASBESTOS % | |
|--|----------------------|---|-------------------------|--------------------------------|------------|---------------------|---------------|
| | | | Fibrous | Non-Fibrous | | | |
| SFL-21 B2313882.054 | Window Caulking | Homogeneous White, Off-white Non-fibrous Bound | 5% | Cellulose | 95% | Caulk | None Detected |
| SFL-22 Layer 1 B2313882.055 | Stucco Window Panels | Heterogeneous White, Off-white Non-fibrous Bound | <1% | Cellulose | 65% | Binder | None Detected |
| SFL-22 Layer 2 B2313882.055 | Stucco Window Panels | Heterogeneous Gray Fibrous Bound | <1% | Cellulose 15% Fiberglass | 55% 30% | Binder Silicates | None Detected |
| SFL-23 Layer 1 B2313882.056 | Stucco Window Panels | Heterogeneous White, Off-white Non-fibrous Bound | <1% | Cellulose | 65% | Binder | None Detected |
| SFL-23 Layer 2 B2313882.056 | Stucco Window Panels | Heterogeneous Gray Fibrous Bound | <1% | Cellulose 15% Fiberglass | 55% 30% | Binder Silicates | None Detected |
| SFL-24 Layer 1 B2313882.057 | Stucco Window Panels | Heterogeneous White, Off-white Non-fibrous Bound | <1% | Cellulose | 65% | Binder | None Detected |
| SFL-24 Layer 2 B2313882.057 | Stucco Window Panels | Heterogeneous Gray Fibrous Bound | <1% | Cellulose 15% Fiberglass | 55% 30% | Binder Silicates | None Detected |



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Terracon Consultants, Inc.
2401 Brentwood Road, Suite 107
Raleigh, NC 27604

Lab Code: B2313882
Date Received: 06-28-23
Date Analyzed: 07-03-23
Date Reported: 07-03-23

Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|-------------------------------|--------------------|--|-------------------------|-----------|-------------|-----------------|---------------|
| | | | Fibrous | | Non-Fibrous | | |
| SFL-25 B2313882.058 | Door Caulk | Heterogeneous White, Gray Non-fibrous Bound | 5% | Cellulose | 5% | Paint Caulk | None Detected |
| SFL-26 B2313882.059 | Door Caulk | Heterogeneous White, Gray Non-fibrous Bound | 5% | Cellulose | 5% | Paint Caulk | None Detected |
| SFL-27 B2313882.060 | Door Caulk | Heterogeneous White, Gray Non-fibrous Bound | 5% | Cellulose | 5% | Paint Caulk | None Detected |
| SFL-28 B2313882.061 | Window Caulking | Heterogeneous Gray Non-fibrous Bound | 5% | Cellulose | 5% | Paint Caulk | None Detected |
| SFL-29 B2313882.062 | Window Caulking | Heterogeneous Gray Non-fibrous Bound | 5% | Cellulose | 5% | Paint Caulk | None Detected |
| SFL-30 B2313882.063 | Window Caulking | Heterogeneous Gray Non-fibrous Bound | 5% | Cellulose | 5% | Paint Caulk | None Detected |
| SFL-31 B2313882.064 | Cmu Block Coating | Heterogeneous Yellow, White Non-fibrous Bound | | | 75% | Binder Paint | None Detected |

Samples B2313882.64 - B2313882.109 analyzed by J. Cox



ASBESTOS BULK ANALYSIS

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Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % |
|------------------------------------|--------------------|-------------------|-------------------------|-------------|---------------|
| | | | Fibrous | Non-Fibrous | |
| SFL-32 B2313882.065 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | Cream,White | 25% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| SFL-33 B2313882.066 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | Blue,White | 25% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| SFL-34 B2313882.067 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | Yellow,White | 25% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| SFL-35 B2313882.068 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | Yellow,White | 25% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| SFL-36 B2313882.069 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | Yellow,White | 25% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| SFL-37 B2313882.070 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | Yellow,White | 25% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| SFL-38 B2313882.071 A | Floor Tile | Heterogeneous | 100% | Vinyl | None Detected |
| | | Light Gray | | | |
| | | Non-fibrous | | | |
| | | Bound | | | |



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Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | | ASBESTOS % |
|------------------------------------|-----------------------------|---|-------------------------|-------------------------|------------|---------------|---------------|
| | | | Fibrous | Non-Fibrous | | | |
| B2313882.071 B | Mastic | Heterogeneous Black Non-fibrous Bound | 97% | Tar | | | 3% Chrysotile |
| SFL-39 B2313882.072 A | Floor Tile | Heterogeneous Light Gray Non-fibrous Bound | 100% | Vinyl | | | None Detected |
| B2313882.072 B | Sample Not Analyzed per COC | | | | | | |
| SFL-40 B2313882.073 A | Floor Tile | Heterogeneous Light Gray Non-fibrous Bound | 100% | Vinyl | | | None Detected |
| B2313882.073 B | Sample Not Analyzed per COC | | | | | | |
| CE-01 B2313882.074 | Built-Up Roofing | Heterogeneous Black,Brown Fibrous Bound | 30% 20% | Cellulose Fiberglass | 40% 10% | Tar Gravel | None Detected |
| CE-02 B2313882.075 | Built-Up Roofing | Heterogeneous Black,Brown Fibrous Bound | 30% 20% | Cellulose Fiberglass | 40% 10% | Tar Gravel | None Detected |
| CE-03 B2313882.076 | Built-Up Roofing | Heterogeneous Black,Brown Fibrous Bound | 30% 20% | Cellulose Fiberglass | 40% 10% | Tar Gravel | None Detected |



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Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | ASBESTOS % |
|------------------------------|-----------------------------|---|-------------------------|-------------|-------------------------------------|----------------------|
| | | | Fibrous | Non-Fibrous | | |
| CE-04 B2313882.077 | Roof Mastic | Heterogeneous Black, Gray Fibrous Bound | 5% | Cellulose | 95% Tar | None Detected |
| CE-05 B2313882.078 | Roof Mastic | Heterogeneous Black, Gray Fibrous Bound | 5% | Cellulose | 95% Tar | None Detected |
| CE-06 B2313882.079 | Roof Mastic | Heterogeneous Black, Gray Fibrous Bound | 5% | Cellulose | 95% Tar | None Detected |
| CE-07 B2313882.080 | Window Caulking | Heterogeneous White, Off-white Non-fibrous Bound | | | 95% Caulk 2% Paint | 3% Chrysotile |
| CE-08 B2313882.081 | Sample Not Analyzed per COC | | | | | |
| CE-09 B2313882.082 | Sample Not Analyzed per COC | | | | | |
| CE-10 B2313882.083 | Window Glazing | Heterogeneous White, Off-white Non-fibrous Bound | | | 85% Caulk 10% Binder 5% Paint | None Detected |
| CE-11 B2313882.084 | Window Glazing | Heterogeneous White, Off-white Non-fibrous Bound | | | 85% Caulk 10% Binder 5% Paint | None Detected |



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Date Received: 06-28-23
Date Analyzed: 07-03-23
Date Reported: 07-03-23

Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % |
|------------------------------|--------------------|-----------------------|-------------------------|-------------|----------------------|
| | | | Fibrous | Non-Fibrous | |
| CE-12 B2313882.085 | Window Glazing | Heterogeneous | 85% | Caulk | None Detected |
| | | White, Off-white | 10% | Binder | |
| | | Non-fibrous | 5% | Paint | |
| | | Bound | | | |
| CE-13 B2313882.086 | Door Caulk | Heterogeneous | 95% | Caulk | None Detected |
| | | Gray, Off-white | 5% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| CE-14 B2313882.087 | Door Caulk | Heterogeneous | 95% | Caulk | None Detected |
| | | Gray, Off-white | 5% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| CE-15 B2313882.088 | Door Caulk | Heterogeneous | 95% | Caulk | None Detected |
| | | Gray, Off-white | 5% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| CE-16 B2313882.089 | Door Caulk Residue | Heterogeneous | 95% | Caulk | None Detected |
| | | Off-white, Light Gray | 5% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| CE-17 B2313882.090 | Door Caulk Residue | Heterogeneous | 95% | Caulk | None Detected |
| | | Off-white, Light Gray | 5% | Paint | |
| | | Non-fibrous | | | |
| | | Bound | | | |
| CE-18 B2313882.091 | Wall Mastic | Heterogeneous | 97% | Tar | 3% Chrysotile |
| | | Black, Light Gray | | | |
| | | Fibrous | | | |
| | | Bound | | | |



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Date Received: 06-28-23
Date Analyzed: 07-03-23
Date Reported: 07-03-23

Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | | ASBESTOS % |
|----------------------------------|--------------------------------|--|-------------------------|------------------|--------------------|---------------|
| | | | Fibrous | Non-Fibrous | | |
| CE-19 B2313882.092 | Sample Not Analyzed per COC | | | | | |
| CE-20 B2313882.093 | Sample Not Analyzed per COC | | | | | |
| CE-21 B2313882.094 | Roof Flashing | Heterogeneous Silver,Black Fibrous Bound | 5% | Cellulose 90% | Tar 5% Paint | None Detected |
| Unable to separate silver paint. | | | | | | |
| CE-22 B2313882.095 | Roof Flashing | Heterogeneous Silver,Black Fibrous Bound | 5% | Cellulose 90% | Tar 5% Paint | None Detected |
| Unable to separate silver paint. | | | | | | |
| CE-23 B2313882.096 | Roof Flashing | Heterogeneous Silver,Black Fibrous Bound | 5% | Cellulose 90% | Tar 5% Paint | None Detected |
| Unable to separate silver paint. | | | | | | |
| CE-24 B2313882.097 | Roof Caulking | Heterogeneous Tan,Off-white Non-fibrous Bound | | 95% 5% | Caulk Paint | None Detected |
| CE-25 B2313882.098 | Roof Caulking | Heterogeneous Tan,Off-white Non-fibrous Bound | | 95% 5% | Caulk Paint | None Detected |
| CE-26 B2313882.099 | Roof Caulking | Heterogeneous Tan,Off-white Non-fibrous Bound | | 95% 5% | Caulk Paint | None Detected |



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ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % |
|------------------------------|--------------------|-------------------|-------------------------|-------------|---------------|
| | | | Fibrous | Non-Fibrous | |
| CE-27 B2313882.100 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | White, Off-white | 15% | Silicates | |
| | | Non-fibrous | 10% | Paint | |
| | | Bound | | | |
| CE-28 B2313882.101 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | White, Off-white | 15% | Silicates | |
| | | Non-fibrous | 10% | Paint | |
| | | Bound | | | |
| CE-29 B2313882.102 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | White, Off-white | 15% | Silicates | |
| | | Non-fibrous | 10% | Paint | |
| | | Bound | | | |
| CE-30 B2313882.103 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | White, Off-white | 15% | Silicates | |
| | | Non-fibrous | 10% | Paint | |
| | | Bound | | | |
| CE-31 B2313882.104 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | White, Off-white | 15% | Silicates | |
| | | Non-fibrous | 10% | Paint | |
| | | Bound | | | |
| CE-32 B2313882.105 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | Green, Off-white | 15% | Silicates | |
| | | Non-fibrous | 10% | Paint | |
| | | Bound | | | |
| CE-33 B2313882.106 | Cmu Block Coating | Heterogeneous | 75% | Binder | None Detected |
| | | White, Off-white | 15% | Silicates | |
| | | Non-fibrous | 10% | Paint | |
| | | Bound | | | |



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Project: Moore County Schools

ASBESTOS BULK PLM, EPA 600 METHOD

| Client ID Lab ID | Lab Description | Lab Attributes | NON-ASBESTOS COMPONENTS | | ASBESTOS % |
|------------------------------|-------------------------|-------------------|-------------------------|-------------|---------------|
| | | | Fibrous | Non-Fibrous | |
| CE-34 B2313882.107 | Interior Window Glazing | Heterogeneous | 85% | Caulk | None Detected |
| | | White, Off-white | 15% | Binder | |
| | | Non-fibrous | <1% | Paint | |
| | | Bound | | | |
| CE-35 B2313882.108 | Interior Window Glazing | Heterogeneous | 85% | Caulk | None Detected |
| | | White, Off-white | 15% | Binder | |
| | | Non-fibrous | <1% | Paint | |
| | | Bound | | | |
| CE-36 B2313882.109 | Interior Window Glazing | Heterogeneous | 85% | Caulk | None Detected |
| | | White, Off-white | 15% | Binder | |
| | | Non-fibrous | <1% | Paint | |
| | | Bound | | | |



LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
Non-Trem = Non-Asbestiform Tremolite
Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REPORTING LIMIT FOR POINT COUNTS: 0.25% by 400 Points or 0.1% by 1,000 Points

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. *Estimated measurement of uncertainty is available on request.*

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by Eurofins CEI. Eurofins CEI makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Information provided by customer includes customer sample ID and sample description.

ANALYST: Santi Nicolella
Santi Nicolella

APPROVED BY: Tianbao Bai
Tianbao Bai, Ph.D., CIH
Laboratory Director





CEI

CHAIN OF CUSTODY

109

730 SE Maynard Road, Cary, NC 27511
 Tel: 866-481-1412; Fax: 919-481-1442

| | |
|----------------------|----------|
| LAB USE ONLY: | |
| ECEI Lab Code: | B2313882 |
| ECEI Lab I.D. Range: | |

| COMPANY INFORMATION | | PROJECT INFORMATION |
|---|------|---------------------------------------|
| ECEI CLIENT #: 24578 | | Job Contact: Anthony Scialdone |
| Company: Terracon Consultants | | Email / Tel: |
| Address: 2401 Brentwood Road, Suite 107 | | Project Name: Moore County Schools |
| Raleigh NC, 27604 | | Project ID#: |
| Email: ajscialdone@terracon.com | | PO #: 70237323 |
| Tel: 919-332-0785 | Fax: | STATE SAMPLES COLLECTED IN: NC |

ECEI standard terms are Net 30 days

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

| ASBESTOS | METHOD | TURN AROUND TIME | | | | | |
|------------------------|----------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|
| | | 4 HR | 8 HR | 1 DAY | 2 DAY | 3 DAY | 5 DAY |
| PLM BULK | EPA 600 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| PLM POINT COUNT (400) | EPA 600 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PLM POINT COUNT (1000) | EPA 600 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PLM GRAV w POINT COUNT | EPA 600 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PLM BULK | CARB 435 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | |
|---|--|
| REPORTING INSTRUCTIONS | *Check boxes if analyst should follow reporting instructions |
| Separate Drywall / Joint Compound Layers | <input type="checkbox"/> |
| Positive Stop | <input checked="" type="checkbox"/> |

| | | | |
|---------------------------------|------------------|---|------------------|
| REMARKS / SPECIAL INSTRUCTIONS: | | <input checked="" type="checkbox"/> Accept Samples <input type="checkbox"/> Reject Samples | |
| Relinquished By: | Date/Time | Received By: | Date/Time |
| <i>[Signature]</i> | 6/28/23 | EY | 6/28/23 4:10pm |

By submitting samples, you are agreeing to ECEI's Terms and Conditions.
 Samples will be disposed of 30 days after analysis

Drop OK



CEI

SAMPLING FORM

| Sample ID # | HA # | Description | Sample Location |
|-------------|------|--------------------------------|--------------------------|
| VL-01 | 1 | Gray Roof Mastic | Built-Up Roof |
| VL-02 | 1 | Gray Roof Mastic | Built-Up Roof |
| VL-03 | 1 | Gray Roof Mastic | Built-Up Roof |
| VL-04 | 2 | Built-Up Roof | Built-Up Roof |
| VL-05 | 2 | Built-Up Roof | Built-Up Roof |
| VL-06 | 2 | Built-Up Roof | Built-Up Roof |
| VL-07 | 3 | Roofing Under Rubber Membrane | Membrane Roof |
| VL-08 | 3 | Roofing Under Rubber Membrane | Membrane Roof |
| VL-09 | 3 | Roofing Under Rubber Membrane | Membrane Roof |
| VL-10 | 4 | Asphalt Roof Shingle/Tar Paper | Pitched Roof |
| VL-11 | 4 | Asphalt Roof Shingle/Tar Paper | Pitched Roof |
| VL-12 | 4 | Asphalt Roof Shingle/Tar Paper | Pitched Roof |
| VL-13 | 5 | Roof Flashing | Built-Up Roof |
| VL-14 | 5 | Roof Flashing | Built-Up Roof |
| VL-15 | 5 | Roof Flashing | Built-Up Roof |
| VL-16 | 6 | White Window Caulk | Exterior - Upper Windows |
| VL-17 | 6 | White Window Caulk | Exterior - Upper Windows |
| VL-18 | 6 | White Window Caulk | Exterior - Upper Windows |
| VL-19 | 7 | Gray Window Glazing | Exterior - Upper Windows |
| VL-20 | 7 | Gray Window Glazing | Exterior - Upper Windows |
| VL-21 | 7 | Gray Window Glazing | Exterior - Upper Windows |
| VL-22 | 8 | Gray Door Caulk | Exterior |
| VL-23 | 8 | Gray Door Caulk | Exterior |
| VL-24 | 8 | Gray Door Caulk | Exterior |
| VL-25 | 9 | White Window Glazing | Exterior - Lower Windows |
| VL-26 | 9 | White Window Glazing | Exterior - Lower Windows |
| VL-27 | 9 | White Window Glazing | Exterior - Lower Windows |
| VL-28 | 10 | Gray Window Caulk | Exterior - Lower Windows |
| VL-29 | 10 | Gray Window Caulk | Exterior - Lower Windows |
| VL-30 | 10 | Gray Window Caulk | Exterior - Lower Windows |
| VL-31 | 11 | Waterproofing Mastic | Exterior |
| VL-32 | 11 | Waterproofing Mastic | Exterior |
| VL-33 | 11 | Waterproofing Mastic | Exterior |
| SFL-01 | 12 | Built-Up Roof | Built-Up Roof |
| SFL-02 | 12 | Built-Up Roof | Built-Up Roof |
| SFL-03 | 12 | Built-Up Roof | Built-Up Roof |
| SFL-04 | 13 | Asphalt Roof Shingle/Tar Paper | Pitched Roof |
| SFL-05 | 13 | Asphalt Roof Shingle/Tar Paper | Pitched Roof |
| SFL-06 | 13 | Asphalt Roof Shingle/Tar Paper | Pitched Roof |
| SFL-07 | 14 | Gray Window Caulk | Exterior - Upper Windows |
| SFL-08 | 14 | Gray Window Caulk | Exterior - Upper Windows |
| SFL-09 | 14 | Gray Window Caulk | Exterior - Upper Windows |
| SFL-10 | 15 | White Window Glazing | Exterior - Upper Windows |
| SFL-11 | 15 | White Window Glazing | Exterior - Upper Windows |
| SFL-12 | 15 | White Window Glazing | Exterior - Upper Windows |
| SFL-13 | 16 | Black Wall Mastic | Roof Elevations |
| SFL-14 | 16 | Black Wall Mastic | Roof Elevations |
| SFL-15 | 16 | Black Wall Mastic | Roof Elevations |

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CEI

SAMPLING FORM

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| Sample ID # | HA # | Description | Sample Location |
|-------------|------|--|------------------------|
| SFL-16 | 17 | Roof Flashing | Built-Up Roof |
| SFL-17 | 17 | Roof Flashing | Built-Up Roof |
| SFL-18 | 17 | Roof Flashing | Built-Up Roof |
| SFL-19 | 18 | White Window Caulk | Side Windows/Panels |
| SFL-20 | 18 | White Window Caulk | Side Windows/Panels |
| SFL-21 | 18 | White Window Caulk | Side Windows/Panels |
| SFL-22 | 19 | Stucco Window Panels | Side Windows/Panels |
| SFL-23 | 19 | Stucco Window Panels | Side Windows/Panels |
| SFL-24 | 19 | Stucco Window Panels | Side Windows/Panels |
| SFL-25 | 20 | White Door Caulk | Exterior |
| SFL-26 | 20 | White Door Caulk | Exterior |
| SFL-27 | 20 | White Door Caulk | Exterior |
| SFL-28 | 21 | Gray Window Caulk | End Windows |
| SFL-29 | 21 | Gray Window Caulk | End Windows |
| SFL-30 | 21 | Gray Window Caulk | End Windows |
| SFL-31 | 22 | CMU Block Coating | Gymnasium |
| SFL-32 | 22 | CMU Block Coating | Gymnasium |
| SFL-33 | 22 | CMU Block Coating | Gymnasium |
| SFL-34 | 22 | CMU Block Coating | Gymnasium |
| SFL-35 | 22 | CMU Block Coating | Gymnasium |
| SFL-36 | 22 | CMU Block Coating | Gymnasium |
| SFL-37 | 22 | CMU Block Coating | Gymnasium |
| SFL-38 | 23 | 12" x 12" Light Gray Floor Tile/Mastic | Gymnasium |
| SFL-39 | 23 | 12" x 12" Light Gray Floor Tile/Mastic | Gymnasium |
| SFL-40 | 23 | 12" x 12" Light Gray Floor Tile/Mastic | Gymnasium |
| CE-01 | 24 | Built-Up Roof | Roof |
| CE-02 | 24 | Built-Up Roof | Roof |
| CE-03 | 24 | Built-Up Roof | Roof |
| CE-04 | 25 | Gray Roof Mastic | Roof |
| CE-05 | 25 | Gray Roof Mastic | Roof |
| CE-06 | 25 | Gray Roof Mastic | Roof |
| CE-07 | 26 | White Window Caulk | Exterior |
| CE-08 | 26 | White Window Caulk | Exterior |
| CE-09 | 26 | White Window Caulk | Exterior |
| CE-10 | 27 | White Window Glazing | Exterior |
| CE-11 | 27 | White Window Glazing | Exterior |
| CE-12 | 27 | White Window Glazing | Exterior |
| CE-13 | 28 | Gray Door Caulk | Exterior |
| CE-14 | 28 | Gray Door Caulk | Exterior |
| CE-15 | 28 | Gray Door Caulk | Exterior |
| CE-16 | 29 | White Door Caulk Residue | Exterior - Boiler Room |
| CE-17 | 29 | White Door Caulk Residue | Exterior - Boiler Room |
| CE-18 | 30 | Black Wall Mastic | Roof Elevations |
| CE-19 | 30 | Black Wall Mastic | Roof Elevations |
| CE-20 | 30 | Black Wall Mastic | Roof Elevations |
| CE-21 | 30 | Roof Flashing | Roof |



SAMPLING FORM

CEI

| Sample ID # | HA # | Description | Sample Location |
|-------------|------|-------------------------|-----------------|
| CE-22 | 30 | Roof Flashing | Roof |
| CE-23 | 30 | Roof Flashing | Roof |
| CE-24 | 31 | Tan Roof Caulk | Roof Elevations |
| CE-25 | 31 | Tan Roof Caulk | Roof Elevations |
| CE-26 | 31 | Tan Roof Caulk | Roof Elevations |
| CE-27 | 32 | CMU Block Coating | Gymnasium |
| CE-28 | 32 | CMU Block Coating | Gymnasium |
| CE-29 | 32 | CMU Block Coating | Gymnasium |
| CE-30 | 32 | CMU Block Coating | Gymnasium |
| CE-31 | 32 | CMU Block Coating | Gymnasium |
| CE-32 | 32 | CMU Block Coating | Gymnasium |
| CE-33 | 32 | CMU Block Coating | Gymnasium |
| CE-34 | 33 | Interior Window Glazing | Gymnasium |
| CE-35 | 33 | Interior Window Glazing | Gymnasium |
| CE-36 | 33 | Interior Window Glazing | Gymnasium |

.109

Limited Asbestos Inspection Report

Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina

July 6, 2023 | Terracon Project No. 70237323



APPENDIX D

PHOTOGRAPHS



Limited Asbestos Inspection Report
Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina
Photos taken June 26, 2023 | Terracon Project No. 70237323

VASS LAKEVIEW ELEMENTARY SCHOOL



Photo #1 Non-asbestos gray roof mastic (HA #1)



Photo #2 Non-asbestos built-up roofing (HA #2)



Photo #3 Non-asbestos roofing under rubber membrane roof (HA #3)



Photo #4 Non-asbestos asphalt-roof shingles/tar paper (HA #4)



Photo #5 Non-asbestos roof flashing (HA #5)



Photo #6 Asbestos-containing white window caulk (HA #6)



Limited Asbestos Inspection Report
Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina
Photos taken June 26, 2023 | Terracon Project No. 70237323



Photo #7 Non-asbestos gray window glazing (HA #7)



Photo #8 Asbestos-containing gray door caulk (HA #8)



Photo #9 Asbestos-containing white window glazing (HA #9) and asbestos-containing gray window caulk (HA #10)



Photo #10 Asbestos-containing waterproofing mastic (HA #11)

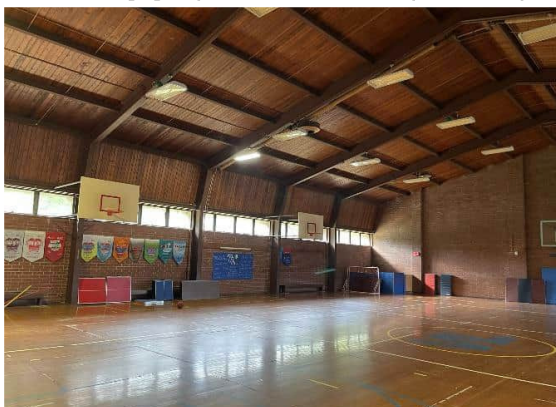


Photo #11 Typical interior view of gymnasium

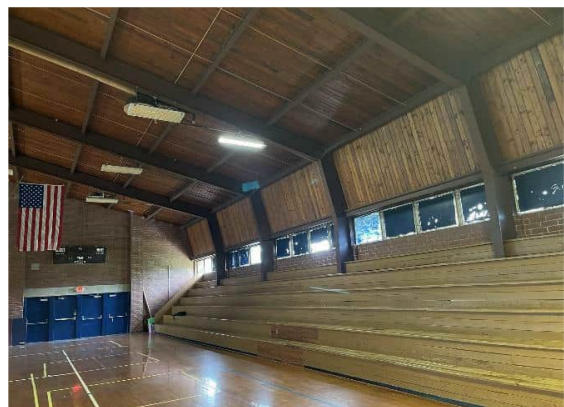


Photo #12 Typical interior view of gymnasium



Limited Asbestos Inspection Report
Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina
Photos taken June 26, 2023 | Terracon Project No. 70237323

SANDHILLS FARM LIFE ELEMENTARY SCHOOL



Photo #13 Non-asbestos built-up roofing (HA #12)



Photo #14 Non-asbestos asphalt roof shingles/tar paper (HA #13)



Photo #15 Non-asbestos gray window caulk (HA #14) and non-asbestos white window glazing (HA #15)



Photo #16 Non-asbestos black wall mastic (HA #16) and non-asbestos silver paint/roof flashing (HA #17)

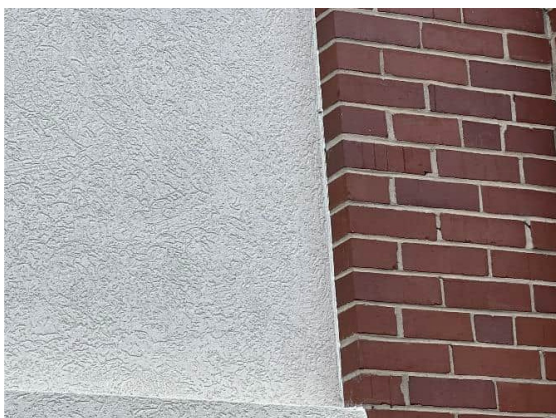


Photo #17 Non-asbestos white window caulk (HA #18) and non-asbestos stucco window panels (HA #19)

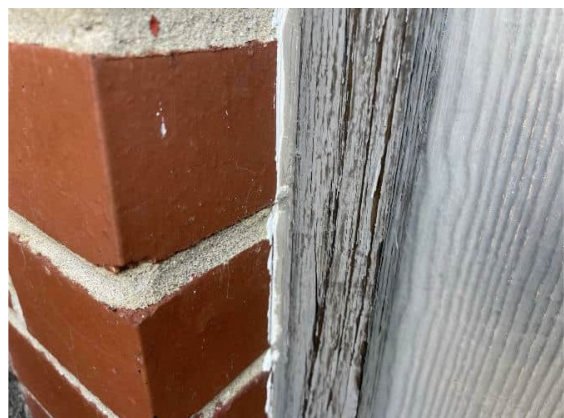


Photo #18 Non-asbestos white door caulk (HA #20)

Limited Asbestos Inspection Report

Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina

Photos taken June 26, 2023 | Terracon Project No. 70237323



Photo #19 Non-asbestos gray window caulk (HA #21)



Photo #20 Non-asbestos CMU block coating (HA #22)



Photo #21 Non-asbestos 12" x 12" light gray floor tile with asbestos-containing mastic (HA #23)

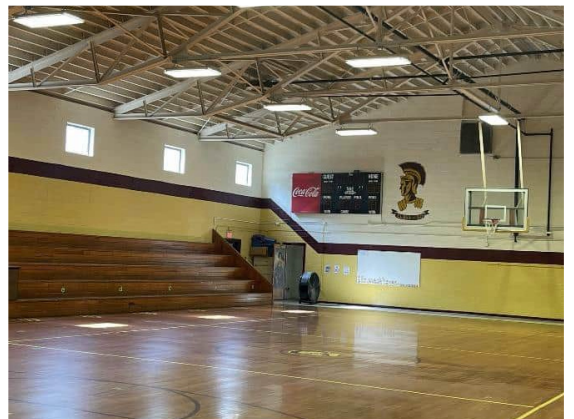


Photo #22 Typical interior view of gymnasium



Limited Asbestos Inspection Report
Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina
Photos taken June 26, 2023 | Terracon Project No. 70237323

CARTHAGE ELEMENTARY SCHOOL



Photo #23 Non-asbestos built-up roofing (HA #24)



Photo #24 Non-asbestos gray roof mastic (HA #25)



Photo #25 Asbestos-containing white window caulk (HA #26) and non-asbestos white window glazing (HA #27)



Photo #26 Non-asbestos gray door caulk (HA #28)



Photo #27 Non-asbestos white door caulk residue (HA #29)



Photo #28 Asbestos-containing black wall mastic (HA #30)



Limited Asbestos Inspection Report

Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina

Photos taken June 26, 2023 | Terracon Project No. 70237323



Photo #29 Non-asbestos roof flashing (HA #31) and non-asbestos tan roof caulk (HA #32)



Photo #30 Non-asbestos CMU block coating (HA #33)



Photo #31 Non-asbestos interior window glazing (HA #34)



Photo #32 Typical interior view of gymnasium

Limited Asbestos Inspection Report


Moore County Schools Gymnasium Renovation Project | Moore County, North Carolina

July 6, 2023 | Terracon Project No. 70237323



APPENDIX E
ACCREDITATION

**North Carolina
Asbestos Accreditation**



Anthony J Scialdone
111 Tower Dr
Angier, NC 27501
136899

| EXPIRATION | | | |
|--------------|-------|-------|-----|
| 06-30-2023 | | | |
| DOB | SEX | HT | WT |
| 11-06-1971 | M | 5'11" | 250 |
| CLASS | # | EXP | |
| AIR MONITOR | 80759 | 06-23 | |
| DESIGNER | 40426 | 06-23 | |
| INSPECTOR | 12284 | 06-23 | |
| MGMT PLANNER | 20962 | 06-23 | |

SECTION 00 41 00

BID FORM

STIPULATED SUM

Moore County Schools - Gym Modernizations / Renovations - Phase 2

Sandhills Farm Life Elementary School

Vass-Lakeview Elementary School

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 place 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 January 17, 2024, and shall be substantially complete with the work in 160 days. 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.

Stipulated Sum Allowances (SSA)

- SSA-1: Wood Blocking / Decking Replacement\$50,000.00**
- SSA-2: Primary Power Electric Service.....\$40,000.00**
- SSA-3: Painting\$10,000.00**

Quantity Allowances (QA)

- QA-1: Health Grade ACT – Replace Missing Tiles and Grid1,000 Square Feet**

Contingency Allowances (CA)

- CA-1: General Contingency Allowance:.....\$100,000.00**

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 - Roofing - Replace
Damaged T&G Wood Plank Deck\$ _____ Per 100 SF**
- Unit Price No. 8 - Roofing - Replace
Damaged Wood Blocking\$ _____ Per 10 Board Ft**
- Unit Price No. 9 - Roofing - Re-secure
Wood Decking To Existing Framing.....\$ _____ Per 1,000 Fasteners**
- Unit Price No. 10 - Roofing - Plate Over
Deteriorated Wood Decking.....\$ _____ Per SF**
- Unit Price No. 11 - Site Bollards\$ _____ Each**
- Unit Price No. 12 - Health Grade ACT and Grid\$ _____ Per SF**

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)

Addenda Received and Used in Computing Bids:

Addendum No. 1 Dated _____

Addendum No. 2 Dated _____

Addendum No. 3 Dated _____

Addendum No. 4 Dated _____

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 |
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*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.

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

County of Moore

(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.

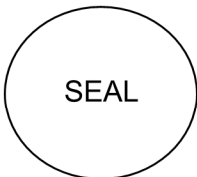
The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure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

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

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

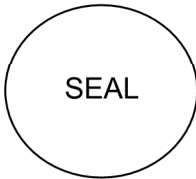
The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

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.

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

County of Moore

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

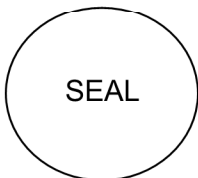
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

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.

Moore County Schools - AFFIDAVIT D – Good Faith Efforts

County of Moore

(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# _____ (Project Name) 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**)

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: _____

PROJECT NAME: _____

THIS AGREEMENT, in four (4) copies, made this ___ day of _____, Two Thousand and Twenty-Three by and between Moore County Schools Board of Education (herein referred to as the "Owner"), whose mailing address is 5277 US-15, Carthage, NC 28327 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 [and renovations] [of] [at] _____ (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 SfL+a Architects dated November 22, 2023, for Moore County Schools, and for the project named MCS – Gymnasium Modernizations / Renovations – Phase 2, including the following addenda:

List each addendum, date, and total pages. If none, delete this language and state “None”.

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:

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

- 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 and state “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 and state “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 SfL+a Architects whose address is 333 Fayetteville Street, Suite 225, Raleigh, NC 27601, 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 _____ Dollars (\$ _____) herein referred to as the "Contract Sum". This amount includes the base bid and the Alternates in Section 2.2 above and includes the value engineering items and other contract modifications noted in Section 2.3 above that total \$ _____.
- 5.2 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 | | \$ |
| Unit Price No. 9 | | \$ |
| Unit Price No. 10 | | \$ |
| Unit Price No. 11 | | \$ |
| Unit Price No. 12 | | |

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 up to three (3) printed set(s) of drawings and three (3) printed set(s) 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, Moore County Schools (hereinbefore called the "Owner") has caused these presents to be signed and its Corporate Seal to be hereunto affixed, attested by its Chairperson and Superintendent, 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.

MOORE COUNTY SCHOOLS

Board Chairperson (*signature*)

Board Chairperson (*print name*)

ATTEST:

Superintendent (*signature*)

Superintendent (*print name*)

[*Corporate Seal*]

This contract was approved by the Board on the ____ day of _____, 20__.

Contractor Company Name

Corporate President (*signature*)

Corporate President (*print name*)

ATTEST:

Corporate Secretary (*signature*)

Corporate Secretary (*print name*)

[*Corporate Seal*]

This instrument has been preaudited in the manner required by the School Budget and Fiscal Control Act.

Finance Officer (*signature*) Date

SECTION 00 61 13
PERFORMANCE AND PAYMENT BOND FORMS

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. PERFORMANCE AND PAYMENT BOND FORMS.
 - 1. The document begins after this page and consists of 4 pages.
 - 2. This Section ends at the end of the referenced document.

PERFORMANCE BOND

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)

LABOR AND MATERIAL PAYMENT BOND

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)

SECTION 00 72 00
GENERAL CONDITIONS

SECTION V
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.

SECTION V
GENERAL CONDITIONS OF THE
CONTRACT FOR CONSTRUCTION

TABLE OF ARTICLES

| | |
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| 1. CONTRACT DOCUMENTS | 9. PAYMENTS AND COMPLETION |
| 2. DESIGN CONSULTANT | 10. PROTECTION OF PERSONS AND PROPERTY |
| 3. OWNER | 11. INSURANCE |
| 4. CONTRACTOR | 12. CHANGES IN THE WORK |
| 5. SUBCONTRACTORS | 13. UNCOVERING AND CORRECTION |
| 6. WORK BY OWNER OR BY SEPARATE CONTRACTORS | 14. TERMINATION OF THE CONTRACT |
| 7. MISCELLANEOUS PROVISIONS | 15. DISPUTE RESOLUTION |
| 8. TIME | |

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 through the Owner or in the manner prescribed by the Owner. 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 an authoritative representative of the home office of the Contractor as well as 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 assumes full responsibility for inspection of the site and determination of the character, quality and quantity of any soil, surface or subsurface conditions that may be encountered or which may affect the Work, and for the means and methods of construction that he employs when performing the Work.

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 Historically Underutilized Businesses (HUB's) per N.C. Gen. Stat. 143-128.2, and as described in the construction 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 skillful 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 Contractor 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 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, 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.

4.13 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 www.ncmcs.org 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 Moore County 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. 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 formally waived by the Owner, 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 Historically Underutilized Businesses (HUB's) 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 Historically Underutilized Businesses (HUB's).
- 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 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. The Contractor and Owner agree that Moore County, North Carolina shall be the proper venue for any litigation arising out of this Agreement.

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 stated below are to be considered reasonably anticipated inclement weather and planned for in the construction schedule per the Contract. 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 at Moore County Airport, North Carolina, 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 | 12 |
| Feb | 11 |
| Mar | 6 |
| Apr | 5 |
| May | 8 |
| Jun | 6 |
| Jul | 8 |
| Aug | 5 |
| Sep | 6 |
| Oct | 4 |
| Nov | 8 |
| 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. Rain days from hurricanes and tropical storms not causing damage in Moore County 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 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

8.3.4.2.4 Delays in the issuance of a 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 the structure is enclosed. 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 Historically Underutilized Businesses (HUB's) Subcontractors whose work is included in the application and the amount due each. In addition, the Historically Underutilized Business (HUB) 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 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 a recovery schedule when required by the Contract,
- .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 Historically Underutilized Businesses (HUB's),
- .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 Architect 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

SECTION SC

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 Supplementary Conditions. The General Conditions and the Supplementary 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 Supplementary Conditions, the Supplementary 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 4 - CONTRACTOR

ADD THE FOLLOWING TO PARAGRAPH 4.10

4.10.3 The superintendent shall not be designated as foreman or engage in the specific activities normally associated with the foreman's position. His duties are designated with the project administration of the Project.

4.10.4 The Contractor shall employ, and have approved by the Owner, a competent foreman who shall be in attendance at the Project site during the progress of the Work 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. The foreman shall direct the day-to-day construction operations of the Project and supervise the sub-contractors to the Contractor. He shall not be employed on any other project for or by Contractor or any other entity during the course of the Work.

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 Supplementary Conditions under Paragraph 8.3 DELAYS AND EXTENSIONS OF TIME.

The bidder proposes and agrees to commence work on a date to be specified in a written Notice to Proceed, estimated to be on or about January 17, 2024. The bidder further proposes and agrees to return the Owner & Contractor Agreement within 10 days for receipt of said contract. The bidder agrees and shall be Substantially Complete with the work within 160 days from the Notice to Proceed. The bidder also agrees to achieve Final Completion and completion of all Commissioning within 30 days from the date of Substantial Completion. The Contractor shall not be granted addition time due to its failure to return the executed contract and required attachments within 10 days.

- 8.2.4.1 The Owner reserves the right to withhold the issuance of Notice to Proceed by up to Sixty (60) 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.

ARTICLE 9 - PAYMENTS AND COMPLETION

ADD THE FOLLOWING TO PARAGRAPH 9.6:

- 9.6.3 Dispute resolution services by the Design Consultant shall be paid by the Contractor at the Architect's current billing rates.
- 9.6.4 Additional services by the Design Consultant due to the Contractor's failure to achieve Substantial Completion by the specified date or time frame shall be paid by the Contractor to the Owner at the Architect's current billing rates. The Design Consultant shall submit costs of all time expended past the contractual date of Substantial Completion attributable to the Owner and Contractor for compensation on a monthly basis.

ADD THE FOLLOWING TO PARAGRAPH 9.10:

- 9.10.1.1 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 9.10.1 of the General Conditions.
- 9.10.2.1 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 9.10.2 of the General Conditions.

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 7517 (<https://boardpolicyonline.com/b=moore>). The Dispute Resolution Policy is also included in the bid and contract documents.

END OF SUPPLEMENTAL CONDITIONS

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. The Contract Documents require Work to be performed at the following separate Work Sites.
 - 1. Work Site Names:
 - a. Sandhills Farm Life Elementary School.
 - b. Vass-Lakeview Elementary School.
- D. Coordinate Work with utilities of Owner, and utilities of public and private agencies.
- E. Permits: Acquire and furnish all necessary permits for the Work.
- F. Contract Work Includes:
 - 1. Work as indicated in the Project Manual, on Drawings and all other Contract Documents.
 - 2. Selective Demolition of Existing Construction.
 - 3. Removal of Existing Asbestos Materials.
 - 4. Renovation work complying with EPA's Renovation, Repair, and Painting Program as related to lead-containing materials.

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. Stipulated Sum Allowances
 - 2. Quantity Allowances.
 - 3. 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. Stipulated Sum Allowances: Change amount is to be the difference between the stipulated sum and the approved actual cost.
 - b. 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".
 - c. 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 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.

1.11 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.

1.12 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 - STIPULATED SUM ALLOWANCES (SSA)

- A. **SSA-1: Wood Blocking / Decking Replacement.**
 - 1. Stipulated Sum: \$50,000.00
 - 2. Include the stated stipulated sum for purchase, delivery, installation, and all other related costs for replacement of wood blocking and/or wood decking.
 - 3. Allowance is for work in addition to base bid work indicated in Contract Documents.
 - 4. Locations to be approved by Architect.
- B. **SSA-2: Primary Power Electric Service.**
 - 1. Stipulated Sum: \$40,000.00
 - 2. Include the stated stipulated sum for purchase, delivery, installation, and all other related costs for primary electrical service.
 - 3. Allowance is for work in addition to base bid work indicated in Contract Documents.
 - 4. Locations to be approved by Architect.
- C. **SSA-3: Painting.**
 - 1. Stipulated Sum: \$10,000.00
 - 2. Include the stated stipulated sum for purchase, delivery, installation, and all other related costs for painting.
 - 3. Allowance is for work in addition to base bid work indicated in Contract Documents.
 - 4. Locations to be approved by Architect.

3.3 SCHEDULE - QUANTITY ALLOWANCES (QA)

- A. **QA-1: Health Grade ACT – Replace Missing Ceiling Tiles and Grid.**
 - 1. Quantity: 1,000 square feet.
 - 2. Include the stated quantity of work for purchase, delivery, installation, and all other related costs.
 - 3. Coordinate with Division 01 Section "Unit Prices".

3.4 SCHEDULE - CONTINGENCY ALLOWANCES (CA)

- A. **CA-1: General Contingency Allowance.**
 - 1. Stipulated Sum: \$100,000.00.
 - 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 indicate 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. Maintain a daily log showing dates, location, and exact quantities of unit price work. Copies of logs and appropriate change order forms shall be submitted with each request for payment for unit price work
- C. 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 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, 4 inches thick, including stone base.
- H. **Unit Price No. 7 - Roofing - Replace Damaged T&G Wood Plank Deck.**
 - 1. Refer to Section 07 50 00.30 - Roofing Preparation.
 - 2. Unit Price: Provide bid price per 100 square feet.
- I. **Unit Price No. 8 - Roofing - Replace Damaged Wood Blocking.**
 - 1. Refer to Section 07 50 00.30 - Roofing Preparation.
 - 2. Unit Price: Provide bid price per 10 board feet.
 - 3. Replace with pressure treated lumber.
- J. **Unit Price No. 9 - Roofing - Re-secure Wood Decking To Existing Framing.**
 - 1. Refer to Section 07 50 00.30 - Roofing Preparation.
 - 2. Unit Price: Provide bid price per 1,000 fasteners.
- K. **Unit Price No. 10 - Roofing - Plate Over Deteriorated Wood Decking.**
 - 1. Refer to Section 07 50 00.30 - Roofing Preparation.
 - 2. Unit Price: Provide bid price per square foot.

L. Unit Price No. 11 - Site Bollards.

1. Refer to Drawings Sheet A-301, Site Bollard detail.
2. Unit Price: Provide bid price per each.

M. Unit Price No. 12 – Health Grade ACT and Grid.

1. Refer to Section 09 51 13 - Acoustical Panel Ceilings
2. Unit Price: Provide bid price per square foot.

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. Requests for Information (RFIs).
 - 4. 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: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination

during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

3.3 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.

3.4 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.

3.5 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.

3.6 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.

3.7 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.

3.8 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.

3.9 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. 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.
- B. PDF: Portable Document Format electronic file.
- C. 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.
- B. Other project management software application that provides similar functionality.
 - 1. "Submittal Exchange" project management software application.
 - a. Requires alternative Drawings software application:
 - 1) "PlanGrid" drawing 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. Other documentation as may be required by Architect or Owner.
 - u. Other pertinent information associated with the Contract Documents.
 - v. 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: DVD disk or other larger capacity digital archive storage device acceptable to Owner.
 - a. Label disk 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 disk.
 - 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 indicated in individual Specification Sections as "action 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; informational.
 - 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 submittal 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. Names 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: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's 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 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 Enclosures 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 Enclosures 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 24 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. 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.
 2. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
 3. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.

4. Locations as indicated on Drawings or as agreed on in pre-mobilization meeting with Owner.
 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 at each site 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 allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
 - 2. Provide protection for plants designated to remain. Replace damaged plants.
 - 3. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

- L. Enclosures and Fencing:
 - 1. Construction: Commercial grade chain link fence.
 - 2. Provide fence not less than 6 feet high where indicated on the Drawings or as necessary between the area of Work and existing structures.
 - 3. Maintaining safe width for circulation, egress, and access for normal daily activities.

- 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 Bidder 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. Coordinate with Owner to deliver and store Spare Parts and Maintenance Products.
- B. 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.
- 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.
- 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.
- 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.

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

1.4 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 acceptable to Architect.
 - 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 disk 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. Enable inserted reviewer comments on draft submittals.

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 electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: 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 Disk. Two copies of disk; 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 in-stalled.
- 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 tele-phone 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.
 - 4. Record Product Data and Samples.
 - 5. Record Project Warranties.
 - 6. Record Certifications.
- 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. 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, ensure legible reproduction quality.
 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:
 - a. Submittal time to be as indicated in Section 01 77 00 - Closeout Procedures.
 5. Final Record Submittals:
 - a. Prior to submission, correct deficiencies observed since 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 one photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
 2. Final Submittal:
 - a. Paper Copy Format: Submit final Record Prints and one photocopied sets.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
- C. Record Shop Drawings Submittal.
1. Initial Submittal:
 - a. Paper Copy Format: Submit one photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
 2. Final Submittal:
 - a. Paper Copy Format: Submit final Record Prints and one photocopied sets.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
- D. Record Specifications Submittal.
1. Initial Submittal:
 - a. Paper Copy Format: Submit one photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
 2. Final Submittal:
 - a. Paper Copy Format: Submit final Record Prints and one photocopied sets.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
- E. Record Product Data and Samples Submittal.
1. Initial Submittal:
 - a. Paper Copy Format: Submit one photocopy of Record Prints.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
 2. Final Submittal:
 - a. Paper Copy Format: Submit final Record Prints and one photocopied sets.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
 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 Project Warranties Manual Submittal.

1. Initial Submittal: Documents to be unexecuted with all information filled in except commencement/expiration dates and certification signatures and dates.
 - a. Paper Copy Format: Submit one photocopy of Manual.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
 2. Final Submittal:
 - a. Paper Copy Format: Submit final Manual and one photocopied sets.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
- G. Record Certifications Submittal.
1. Initial Submittal:
 - a. Paper Copy Format: Submit one photocopy of Certifications.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.
 2. Final Submittal:
 - a. Paper Copy Format: Submit final Certifications and one photocopied sets.
 - b. Electronic Scanned Files Format: Submit two (2) on read-only digital media disk.

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 similarly identifying it (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 SUBMITTALS

- 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 name 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 with same information as indicated for Paper Copy Format.

2.3 RECORD SHOP DRAWINGS SUBMITTALS

- 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 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 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 modification.
 - 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) SUBMITTALS

- 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 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 SUBMITTALS

- 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 of 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 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 with same information as indicated for 3-Ring Binder Format.

2.8 RECORD PROJECT WARRANTIES MANUAL

- 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 disk; 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.

2.9 RECORD CERTIFICATIONS SUBMITTALS

- 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 with same information as indicated for 3-Ring Binder Format.

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 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.

1.4 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 at end of this Section, article SUBMITTAL - DEMONSTRATION AND TRAINING MANUAL.
- B. Initial Demonstration And Training Manual Submittal:
 - 1. Paper Copy Format: Submit one photocopy of Manual.
 - 2. Electronic Copy Format: Submit two (2) on read-only digital media disk.
 - 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 read-only digital media disk.
 - 3. Submittal time to be as indicated in Section 01 77 00 - Closeout Procedures.

1.5 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.

1.6 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 DVD disk.
 - f. If video record of the training session is required, or produced without requirement, include the labeled DVD disk.
- C. Electronic Copy of Demonstration And Training Manual:
- 1. PDF single file format on digital media disk; 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 disk; 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 19
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolishing designated building equipment and fixtures.
 - 2. Demolishing designated construction.
 - 3. Cutting and alterations for completion of the Work.
 - 4. Salvaging designated items for delivery to Owner.
 - 5. Protecting items designated to remain.
 - 6. Removing demolished materials.
- B. Related Requirements:
 - 1. Section 02 82 13 - Asbestos Abatement: Abatement to be completed prior to the work of this Section.
 - 2. Section 02 83 10 - Lead Hazard Renovation Activities.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
 - 2. Coordinate utility and building service interruptions with Owner.
 - a. Schedule with Owner so as not to interfere with Owner's operations.
 - 3. Do not disable or disrupt building fire or life safety systems without three (3) days prior written notice to Owner.
 - 4. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.
- B. Pre-Installation Meetings
 - 1. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
 - a. Convene minimum one week prior to commencing work of this Section. Review the work requirements, project conditions, sequencing, items to be salvaged, items to be delivered to Owner, and construction schedule.
 - b. Confirm status of hazardous materials, requirements, responsibilities, and sequencing.
- C. Scheduling:
 - 1. Section 01 32 00 - Construction Progress Documentation: Requirements for scheduling.
 - 2. Schedule Work to coincide with new construction.
 - 3. Schedule tie-ins to existing systems to minimize disruption.
 - 4. Schedule noisy operations and waste removal that may impact Owner's operations and work in adjoining spaces. Coordinate with Owner.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Demolition Schedule: Indicate details of demolition activities.
 - 1. Include interruptions required for utility and building services.
- C. Shop Drawings:

1. Indicate demolition and removal sequence.
2. Indicate items and location of items designated for salvage and delivery to Owner.
3. Indicate location and construction of temporary work.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures.
- B. Project Record Documents:
 1. Include record of actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.
 2. Include records authorized by both parties of salvaged items delivered to Owner.

1.5 QUALITY ASSURANCE

- A. Conform to applicable code for demolition work, dust control, and products requiring electrical disconnection and re-connection.
- B. Conform to regulatory procedures when hazardous or contaminated materials are discovered.
- C. Obtain required permits from authorities having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Owner and Architect. Do not resume operations until directed.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after Work requirements.
- B. Owner will occupy portions of building immediately adjacent to selective demolition areas. Conduct selective demolition so Owner's operations will not be disrupted.
- C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 HAZARDOUS MATERIALS

- A. Hazardous materials are present in buildings and structures requiring selective demolition activities.
 1. Report(s) of the presence of hazardous materials are available and are to be examined and used by contractors to become aware of locations where hazardous materials are present.
 2. Hazardous material remediation and work activities are part of the contract Work.
 - a. Section 00 31 00 - Available Project Information.
 - b. Section 02 82 13 - Asbestos Abatement.
 - c. Section 02 83 10 - Lead Hazard Renovation Activities.

3. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified in the Contract Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PREPARATION

- A. Notify affected utility companies before starting work and comply with their requirements.
- B. Mark location and termination of utilities.
- C. Erect, and maintain temporary barriers and security devices, including warning signs and lights, and similar measures, for protection of the public, Owner, and existing improvements indicated to remain.
- D. Provide appropriate temporary signage including signage for exit or building egress.
- E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.
- F. Erect and maintain weatherproof closures for exterior openings.
- G. Do not disable or disrupt building fire or life safety systems without three days prior written notice to Owner.
- H. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.
- I. Do not close or obstruct building egress path.
- J. Layout cuts in post tensioned concrete elements to avoid cutting concrete within 12 inches of any stressing tendon. Notify Architect three (3) days in advance of cutting post-tensioned concrete.

3.2 SALVAGE REQUIREMENTS

- A. Coordinate with Owner to identify building components and equipment required to be salvaged and delivered to Owner.
- B. Tagging, marking, and labeling of items to be salvaged is to be by non-destructive means.
- C. Protect designated salvage items from demolition operations until items can be removed.
- D. Tag or label components and equipment Owner designates for salvage.
- E. Carefully remove building components and equipment indicated to be salvaged.
- F. Disassemble as required to permit removal from building.
- G. Package small and loose parts to avoid loss.
- H. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.
- I. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.
- J. Deliver salvaged items to Owner and store in location as directed by Owner. Prepare and present to Owner two duplicate itemized lists of delivered items and require Owner's and

Contractor's signature and date of delivery as receipt for Project record document. Leave one of the authorized receipts in Owner's possession.

3.3 DEMOLITION

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Maintain protected egress from, and access to, adjacent existing buildings at all times.
- C. Do not close or obstruct roadways and/or sidewalks without permits.
- D. Cease operations immediately when structure appears to be in danger and notify Architect.
- E. Disconnect and remove utilities within demolition areas.
- F. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.
- G. Demolish in orderly and careful manner. Protect existing improvements and supporting structural members.
- H. Carefully remove building components indicated to be reused.
 - 1. Disassemble components as required to permit removal.
 - 2. Package small and loose parts to avoid loss.
 - 3. Mark components and packaged parts to permit reinstallation.
 - 4. Store components, protected from construction operations, until reinstalled.
- I. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.
- K. Remove temporary Work.

END OF SECTION

SECTION 02 82 13
ASBESTOS ABATEMENT

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 Requirements
 - a. Project Coordination
 - b. Codes and Regulations
 - c. Air Monitoring - Air Monitoring Firm Services
 - d. Temporary Facilities
 - e. Work Area Preparation
 - f. Worker Protection
 - g. Respiratory Protection
 - h. Decontamination Units
 - i. Project Decontamination
 - j. Work Area Clearance
 - 2. Site Work
 - a. Asbestos Removal
 - b. Disposal of Asbestos-Containing Waste Material
 - 3. Pre-work Asbestos Inspection Checklist
- B. Related Requirements:
 - 1. Section 00 31 00 - Available Project Information:
 - a. Asbestos Materials Information.
 - 2. Division 02 - Existing Conditions: Demolition and renovation work.

1.3 SEQUENCING AND SCHEDULING

- A. Refer to Section 01 10 00 - Summary, Work Sequence article.
- B. Where demolition is required, acquire written certification that asbestos abatement work has been completed prior to beginning demolition work.
- C. Schedule abatement work as to not disrupt Owner's on-site operations.
- D. Indicate abatement activities on Construction Progress Schedule.

1.4 SUBMITTALS

- A. Submit documentation of abatement activities in accordance with Division 01 - General Requirements and for information only, unless otherwise indicated.
 - 1. Include documentation required by Federal, State, and Local authorities have jurisdiction and in accordance with the requirements indicated in the Asbestos Abatement Specifications in PART 3 of this Section.
- B. Submit project closeout Record Documents.

1.5 PROJECT CONDITIONS

- A. Owner will occupy portions of the site immediately adjacent to abatement areas. Conduct abatement work as to not disrupt Owner's operations. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Owner assumes no responsibility for actual condition of structures and areas where abatement work is to be performed. Conditions existing at time of inspection for bidding purpose will be maintained by Owner to the extent practical.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 ASBESTOS ABATEMENT REQUIREMENTS

- A. Asbestos Containing Material (ACM) Abatement: Contractor is to contract with professionals certified and licensed in accordance with Federal, State, and Local regulatory requirements for performance of the ACM Abatement work.
 - 1. Abatement professionals are to be certified and licensed in the State in which the project is located and are to be responsible for the abatement planning, abatement actions, proper disposal of materials, and certification of test results report.
 - 2. Contractor is responsible for Occupational Safety and Health Administration (OSHA) monitoring.
 - 3. Refer to the following related to the ACM Abatement work:
 - a. Contract Documents, including Drawings.
 - b. Section 00 31 00 - Available Project Information.
 - c. Section 02 41 19 - Selective Demolition.
 - d. Specifications indicated in REMOVAL & DISPOSAL SPECIFICATIONS article of this Section.
- B. Owner will contract separately with an Air Monitor contractor for air monitoring, inspection, and clearance services associated with the Contractor's ACM Abatement work. Contractor is to coordinate its abatement work and schedule with Owner and Owner's Air Monitor for coordinated work and services performance. Contractor is to cooperate and participate in Air Monitor's activities. Air Monitor services provided by Owner do not relieve the Contractor from its duty to perform the ACM Abatement work in compliance with Federal, State, and Local regulations and requirement.

3.2 ABATEMENT SPECIFICATIONS

- A. PROJECT COORDINATION
 - 1. GENERAL
 - a. The scope of this project includes the abatement of the following asbestos-containing materials (ACM) and materials containing less than 1% asbestos as outlined in Section 00 31 00 - Available Project Information.
 - b. The Asbestos Abatement Contractor will be a licensed general contractor in either the specialty interior, building, unclassified, or asbestos categories by the North Carolina Licensing Board of General Contractors and limited for the bid amount.

- c. The Asbestos Abatement Contractor shall be responsible for inspecting the site prior to bidding to confirm the scope of the work. Any quantities listed by the designer in the plans, specifications, or other related documents are done so as estimations. The Asbestos Abatement Contractor is responsible for measurements and quantifying the materials to be removed.
 - d. The Asbestos Abatement Contractor shall furnish and is responsible for all costs including, but not limited to: permit fees, perimeter fencing, containment preparation, scaffolding/aerial lifts, labor, materials, services, insurance, and equipment necessary to carry out the asbestos abatement operations. All work will be in accordance with the plans and specifications, applicable EPA and OSHA regulations, and any other applicable state and local government regulations.
 - e. The Asbestos Abatement Contractor/employer has and assumes the responsibility of proceeding in such a manner that he offers his employees a workplace free of recognized hazards causing or likely to cause death or serious injury. The Asbestos Abatement Contractor shall be responsible for performing this asbestos abatement and disposal so that asbestos fiber levels do not exceed the established levels of the personal protective equipment provided to employees.
 - f. The Asbestos Abatement Contractor will be responsible for all costs associated with employee monitoring to meet the OSHA requirements.
 - g. The Asbestos Abatement Contractor is responsible for all costs, including additional visits, should the designer and/or the air-monitoring firm determine that the Asbestos Abatement Contractor failed a final inspection. Notification and scheduling of the final inspection during the project is the responsibility of the Asbestos Abatement Contractor. The Asbestos Abatement Contractor will allow a minimum notice of 48 hours unless the designer and the Asbestos Abatement Contractor agree upon a different time frame.
 - h. Asbestos Abatement Contractor shall coordinate all removal activities with the Owner and designer. Owner shall have continuous use of areas not included in the scope of this project.
2. PERSONNEL
- a. Supervisor
 - 1) All supervisors shall be accredited by the North Carolina Health Hazards Control Unit (HHCU).
 - 2) At least one supervisor on the project shall have a minimum of two years' experience in the administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc.
 - 3) One supervisor shall be provided for every ten workers inside each containment. A minimum of one supervisor shall be provided per asbestos abatement work area.
 - 4) The Asbestos Abatement Contractor shall have at least one employee on the job site in either a foreman or supervisor position that is bilingual in the appropriate languages when employing workers who do not speak fluent English.
 - b. Worker
 - 1) All workers shall be accredited by the North Carolina HHCU.

- 2) The Asbestos Abatement Contractor is responsible for supplying the required number of workers to complete the project within the designated project schedule.
- c. Competent Person
 - 1) A competent person, as defined in the OSHA asbestos standard 29 CFR 1926.1101, employed by the Asbestos Abatement Contractor must be outside each work area at all times to monitor activity, ensure containment security, provide information to visitors, and provide access to the work area.
 - 2) The competent person, employed by the Asbestos Abatement Contractor, shall be bilingual in the appropriate languages when employing workers who do not speak fluent English.
- d. Employees
 - 1) The Asbestos Abatement Contractor is responsible for the behavior of workers within his employment. If at any time during the contracted work, any of his employees are judged to exhibit behavior unfitting for the area or judged to be a nuisance by the Owner or designer, the Asbestos Abatement Contractor shall remove them immediately from the project.
 - 2) The Asbestos Abatement Contractor shall be responsible for compliance with the following concerning employee behavior:
 - a) Under no circumstances are alcohol, drugs, or any other type of controlled substances permitted on the site.
 - b) Firearms are not permitted on the site.
 - c) All workers are restricted to the construction project site only.
 - d) Vehicles will be parked in areas designated by the owner.
 - e) All workers must conform to the following basic dress code when in public areas of the project confines: long pants, shirts, no tank tops, no shorts, no bare backs.
 - f) The Asbestos Abatement Contractor is responsible for disposal of all trash brought on the site by his/her employees; including drink cans, bottles or other food containers and wrappers.
 - g) Eating, drinking, and smoking are not allowed in the containment area(s).
 - 3) Failure to adhere to these rules could result in criminal prosecution and/or removal from the project site.
3. PRE-JOB SUBMITTALS
 - a. Submit one complete, bound set of pre-job submittals to the designer at least two working days prior to start of work. Work is prohibited until the submittal package has been reviewed and approved by the designer. A copy of the submittals shall be kept in a three-ring binder (project log) by the Asbestos Abatement Contractor at the project site in the on-site office of the Asbestos Abatement Contractor.
 - 1) Notifications: Provide copies of Asbestos Permit Application and Notification for Demolition/ Renovation (DHHS 3768), which provide written notice to all required agencies, including North Carolina HHCU, ten working days prior to commencement of abatement activities.
 - 2) Employee List: Provide copies of lists of supervisors and workers, along with their accreditation, to be utilized on the project.

- 3) Permits: Provide copies of approval of a waste disposal site in compliance with 40 CFR 61.154.
 - 4) Project Schedule: Time schedule for the project, outlining the proposed start, setup, clearances, etc. for the various phases of the project.
 - 5) Initial Exposure Assessment: As required by the OSHA construction asbestos standard 29 CFR 1926.1 101.
 - 6) Any other programs or training as outlined by the OSHA and EPA standards.
4. POST-JOB SUBMITTALS
- a. Submit one complete, bound set of post-job submittals to the designer following the final completion of the work. Requests for final payment will not be approved until the submittal package has been reviewed and approved by the designer.
 - 1) Affidavits: Asbestos Abatement Contractor's affidavit of payment of debts and claims, affidavit of release of liens, and consent of surety company to final payment.
 - 2) Manifest: North Carolina Asbestos Waste Shipment Record (DHHS 3787) receipt from landfill operator, which acknowledges the Asbestos Abatement Contractor's delivery(s) of waste material. Include date, quantity of material delivered, and signature of authorized representative of landfill. Also, include name of waste transporter.
 - 3) Daily Supervisor Log: A copy of all daily logs showing the following: name, date, entering and leaving time, company or agency represented, reason for entry for all persons entering the work area, employee's daily air monitoring data as required by the OSHA standard, and written comments by inspectors, industrial hygienists, designers and visitors.
 - 4) Workers: Copies of HHCU asbestos accreditation cards, asbestos training certification forms, and respirator training and fit test documentation of all new employees hired during the project.
 - 5) Special Reports: All documents generated under Section 01043.1.05.
5. SPECIAL REPORTS
- a. General: Except as otherwise indicated, submit special reports to designer within one (1) day of occurrence requiring special report, with copies to others affected by occurrence. Also, keep a copy in the project logbook.
 - b. Unusual Events: When an event of unusual and significant nature occurs at site (examples: failure of negative pressure system, rupture of temporary enclosures), prepare and submit a special report to the designer immediately, listing chain of events, persons participating, response by Asbestos Abatement Contractor's personnet, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise designer in advance at earliest possible date.
 - c. Reporting Accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. A complete copy of the accident report shall be provided to the designer and Owner within 24-hours of the accident occurrence. Record and document date and actions; comply with industry standards for reporting accidents. For this purpose, a significant accident is defined to include events where personal injury is sustained, or

property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

6. CONTINGENCY PLAN

- a. Contingency Plan: Prepare a site-specific contingency plan for emergencies including: fire, accident, power failure, evacuation of injured persons for both life threatening and non-life threatening, or any other event that may require modification or abridgment of decontamination or work area isolation procedures. Include in this plan specific procedures for decontamination or work area isolation. Note that nothing in this specification should impede safe exiting or providing adequate medical attention in the event of an emergency. The plan will be completed prior to beginning any on-site work and shall be kept on-site at all times.
- b. The Asbestos Abatement Contractor shall post outside/in clean room of Personnel Decontamination Unit:
 - 1) Telephone numbers and locations of emergency services including but not limited to fire, ambulance, hospital, police, power company, telephone company and the North Carolina HHCU.
 - 2) A copy of Safety Data Sheets (SDS) for any chemicals used during the asbestos project.
 - 3) The Asbestos Abatement Contractor shall post warning signs in each appropriate language as per the OSHA 29 CFR 1926.1 101 standard.

B. CODES AND REGULATIONS

1. REFERENCE SPECIFICATIONS

The Asbestos Abatement Contractor shall assume full responsibility and liability for compliance with all applicable federal, state and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site.

Unless modified by this project specification, all specifications for stripping, removal, repair, and disposal of asbestos-containing materials shall conform to the following specifications and standards, as applicable, as if completely reproduced herein.

- a. The following regulations published by the Environmental Protection Agency (EPA):
 - 1) "National Emissions Standards for Hazardous Air Pollutants Asbestos," 40 CFR Part 61, Subpart M.
 - 2) "General Provisions," 40 CFR Part 61, Subpart A.
 - 3) "Asbestos-Containing Materials in Schools," 40 CFR Part 763, Subpart E including appendices.
- b. The following regulations published by the U.S. Department of Labor, OSHA:
 - 1) "Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules," Title 29, Part 1910, Section 1001 and Part 1926, Section 1101 of the Code of Federal Regulations.
 - 2) "Respiratory Protection," Title 29, Part 1910, Section 134 of the Code of Federal Regulations.
 - 3) Asbestos Construction Industry Standard, Title 29, Part 1926, of the Code of Federal Regulations.

- 4) "Access to Employee Exposure and Medical Records," Title 29, Part 1910, Section 20 of the Code of Federal Regulations.
- 5) "Hazard Communication," Title 29, Part 1926, Section 59 of the Code of Federal Regulations.
- 6) "Specifications for Accident Prevention Signs and Tags," Title 29, Part 1910, Section 145 of the Code of Federal Regulations.
- c. The following regulations published by North Carolina state agencies:
 - 1) North Carolina Asbestos Hazard Management Program Rules as adopted by 10A NCAC 41C.0600.
 - 2) "North Carolina Occupational Safety and Health Standards for the Construction Industry," 29 CFR Part 1926 as adopted by T13 NCAC 07F .0201, and shipyard T13 : 07F.0500.
 - 3) North Carolina General Statutes, Chapter 95, 97, 130.
- d. The following documents published by the American National Standards Institute:
 - 1) "Fundamentals Governing the Design and Operation of Local Exhaust Systems," Z9.2-1979.
 - 2) "American National Standard for Respiratory Protection Respiratory Use - Physical Qualifications for Personnel," Z88.6-1984.
 - 3) "Practices for Respiratory Protection," Z88.2-1992.
- e. The following publication by the Environmental Information Association:
 - 1) "Managing Asbestos In Buildings: A Guide for Owners and Managers, A Revision to the United States Environmental Protection Agency 1985 document Guidance for Controlling Asbestos-Containing Materials in Buildings (EPA 560/5-85-024) Known as the Purple Book," — 2015.

2. NOTICES

- a. The Asbestos Abatement Contractor shall notify the following offices in writing within the time frame specified by the NESHAP regulations prior to beginning any asbestos removal operations.

- 1) State Agencies

Health Hazards Control Unit
North Carolina Department of Health and Human Services – OEEB
Division of Public Health

(Regular Mail)
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: (919) 707-5950
Fax: (919) 870-4808

(UPS, Fed Ex, etc.)
5605 Six Forks Road
Raleigh, NC 27609-3806

- 2) Emergency Departments
 - a) Notify the local emergency medical services, police and fire departments in writing of the type and scope of work being performed.
- 3) Licenses

- a) Maintain current licenses for Asbestos Abatement Contractor and accreditation for workers and supervisors as required by applicable State or local jurisdictions for the removal, transporting, disposal or other regulated activity relative to the work of this contract.
 - 4) Asbestos Abatement Contractor is responsible for payment of all permit fees required for this project.
- C. AIR MONITORING - AIR MONITORING FIRM
- 1. GENERAL
 - a. The Owner shall be responsible for the coordination and execution of asbestos air monitoring services. Asbestos air monitoring services will be provided to the Owner by the designer.
 - b. Asbestos air monitoring shall be done by a North Carolina accredited Air Monitor under the direct supervision of a North Carolina accredited Supervising Air Monitor (SAM), except for sampling performed by the Asbestos Abatement Contractor to satisfy OSHA requirements.
 - c. SAM shall be accredited per the North Carolina Asbestos Hazard Management (AHM) Program rules.
 - d. Asbestos air monitor shall be accredited as per the AHNI Program rules.
 - e. Employees of the HHCU shall have right of entry into the project.
 - 2. DESCRIPTION OF WORK
 - a. The asbestos air monitoring firm shall offer expertise to Asbestos Abatement Contractor and Owner, but is not directly responsible for the performance of the job.
 - b. At the job site, the asbestos air monitoring firm is expected to observe, be aware, and comment on general work site conditions and activities as they relate to the specifications and profession of industrial hygiene.
 - c. The asbestos air monitoring firm shall furnish the Asbestos Abatement Contractor a copy of the field report, if requested. Copies of field notes and reports of observations shall be kept in project logbook.
 - d. The asbestos air monitoring firm is to conform to the Asbestos Abatement Contractor's schedule and shall respond to necessary changes, provided an advance notice is given as outlined in Section 01043.
 - e. The asbestos air monitoring firm's project monitor shall furnish designer and Asbestos Abatement Contractor with a mobile phone number where they can be reached quickly at all times.
 - f. The asbestos air monitoring firm shall notify the designer and Asbestos Abatement Contractor immediately via phone and within 24 hours in writing, of any failed clearance visits.
 - g. At the completion of the project, the asbestos air monitoring firm shall prepare a report describing the assessment of the project, all asbestos air monitoring data, acceptance letters, calibration records, and a description of the project as it proceeded to completion. The air monitoring firm shall submit four copies of the report to the designer. An electronic copy may be submitted in lieu of hard copies.
 - 3. AIR MONITORING
 - a. Ambient Asbestos Air Monitoring: The purpose of ambient asbestos air monitoring by the asbestos air monitoring firm will be to detect discrepancies in the work area isolation such as:
 - 1) Contamination of the building outside work area with airborne asbestos fibers.

- 2) Failure of filtration or rupture in the negative pressure system.
 - 3) Confirm the work practices established by the Asbestos Abatement Contractor and respiratory protection provided for employees are adequate.
- b. Daily Ambient Monitoring: The asbestos air monitoring firm will monitor the ambient environment as directed in the air monitoring plan using Phase Contrast Microscopy (PCf1) via the NIOSH 7400 method. At a minimum, daily ambient air monitoring for floor tile removal will include sample collection at the following locations: decontamination unit, critical barriers, high efficiency particulate air (HEPA) exhaust, loadout and other areas deemed necessary by the designer, SAM, or on-site air monitor. For window removal, daily ambient air monitoring will include sample collection within the school and adjacent to the work area, both inside and outside. The purpose of this air monitoring will be to detect airborne fiber levels which may challenge the ability of the work area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.
- c. Sampling conducted by the air monitoring firm shall be personally observed . Air sampling pumps shall not be left unattended for extended periods of time.
- d. Work Area Clearance: To determine if the elevated airborne fiber levels encountered during Abatement operations have been reduced to an acceptable level, the asbestos air monitoring firm will sample and analyze air per Section 01714.
- e. In accordance with AHM Program Rules, the SAM shall develop an Abatement Project Monitoring Plan, which complies with EPA and OSHA analytical criteria and will provide a valid representation of airborne fiber concentrations both inside and outside the work area. This program is not intended to satisfy the Asbestos Abatement Contractor's requirement for sampling under the OSHA regulation.
- f. The SAM shall submit a written project monitoring plan to the designer with a copy to the Asbestos Abatement Contractor. The following information shall be required for the submittal.
- 1) The name, address, and telephone number of the air monitoring firm.
 - 2) The name, address, telephone number, and NIOSH's PAT designation and proficiency data for the laboratory analyzing the air samples. Analysis of all samples collected shall be by a laboratory currently proficient in NIOSH's "Proficiency Analytical Testing Program for Laboratory Quality Control" for asbestos. The acceptable sampling and analysis method is NIOSH 7400, latest revision.
 - 3) Persons performing Phase Contrast Microscopy analysis at the asbestos removal location shall be proficient in the American Industrial Hygiene Association's Asbestos Analyst Registry Program (AAR).
 - 4) A proposed air sampling strategy which shall include: a projected number of air samples, locations, the types of air samples to be collected (personal, area, ambient), how the air samples are to be collected (TWA, ceiling, other), the equipment to be used (pumps, calibration equipment, filters, other), and how the samples will be transported to the laboratory.
 - 5) All personal air samples will be collected in such a manner as to comply with OSHA collection and analytical regulations, and to provide a valid representation of airborne fiber levels. The samples collected by the air

monitoring firm on personnel do not satisfy the Asbestos Abatement Contractor's responsibility under OSHA.

- g. Final area air sampling will comply with State and Federal requirements in measuring airborne asbestos following abatement activities.
- h. Air samples will be analyzed and results made available as per the AHM Program Rules. Copies of asbestos air sampling results shall be signed by the SAM and a copy posted at the job site. These copies shall include the following: sample number, sample location, activity represented by sample, flow rate, sample time, comments and sample results. A statement will be included on each submission that the requirements of this contract have been met as they apply to the activities of the SAM.
- i. If TWA samples are being collected by the Asbestos Abatement Contractor for the purpose of reducing respiratory protection requirements, the air monitoring firm shall directly observe the conditions and work practices represented by each sample and make appropriate notes in the bound book on site. The SAM shall review all TWA air sampling results, which are used for reducing respiratory protection requirements before accepting the results.
- j. Supplemental air monitoring may be conducted outside the work area by the HHCU. This supplemental sampling does not fulfill air monitoring responsibilities required by OSHA, EPA or this contract.

D. TEMPORARY FACILITIES

1. GENERAL

- a. Provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the work.
- b. Use qualified tradesmen for installation of temporary services and facilities. Locate, modify and extend temporary services and facilities where they will serve the project adequately and result in minimum interference with the performance of the work.
- c. The Asbestos Abatement Contractor is responsible for verifying that the owner has locked and tagged out all power sources within the work area.

2. WATER SERVICE

- a. The Asbestos Abatement Contractor will be responsible to supply water service at the site. Asbestos Abatement Contractor bears all expense of heating and getting water to the work areas and decontamination areas.
- b. The Asbestos Abatement Contractor shall supply hot and cold water to the decontamination unit in accordance with Section 01563. Hot water shall be supplied at a minimum temperature of 100 degrees Fahrenheit.
- c. After completion of use, connections and fittings shall be removed by the Asbestos Abatement Contractor, without damage or alteration to existing water piping and equipment.

3. ELECTRICAL SERVICE

- a. General: The Asbestos Abatement Contractor shall coordinate the supply of electricity required for execution of the project. The Asbestos Abatement Contractor shall comply with applicable NEMA, NEC and UL standards and governing state and local regulations for materials and layout of temporary electric service. Asbestos Abatement Contractor bears the cost of getting electricity to the work area and supplying the air monitor with cords and GFCIs to conduct air sampling activities.
- b. Ground Fault Protection: Provide receptacle outlets equipped with ground fault circuit interrupters (GFCI), reset button and pilot light, for plug-in connection

- of power tools and equipment. All GFCI shall be located outside of the containment areas. All powered equipment shall be connected to a GFCI.
- c. Provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity and power characteristics to accommodate performance of work during the construction period.
 - d. Provide additional power service and distribution service, consisting of individual dedicated 15-amp 120 volt circuits to electrical drops with receptacle outlets equipped with ground fault interrupt protection, color coded for the exclusive use of the air monitoring firm.
4. **FIRSTAID**
 - a. A minimum of one first aid kit shall be located on the project site. Additional first aid kits as the Asbestos Abatement Contractor feels is adequate or is required by law shall be located throughout the work areas.
 5. **FIRE EXTINGUISHERS**
 - a. Comply with the applicable recommendations of NFPA Standard 10 - "Standard for Portable Fire Extinguishers." Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each work area equipment room and one in the clean rooms of the personnel decontamination units.
 6. **TOILET FACILITIES**
 - a. Provide temporary toilet facilities to be used by Asbestos Abatement Contractor's employees, as well as the employees of the air monitoring firm. Use of the Owner's existing toilet facilities will be at Owner's discretion and these privileges may be revoked at any time.
 7. **PARKING**
 - a. Park only in areas designated by the owner.
 8. **SITE SECURITY**
 - a. The Asbestos Abatement Contractor is responsible for constructing and maintaining a secure regulated area, including the entry/exit areas, by the use of perimeter site fencing. The regulated areas shall be restricted to authorized, trained, and protected personnel. These may include the Asbestos Abatement Contractor's employees, employees of approved subcontractors, regulatory representatives, and any other designated individuals. The Asbestos Abatement Contractor shall establish a list of authorized personnel prior to job start. Abatement locations will be appropriately identified utilizing warning signs as required by OSHA and all city, state, and federal regulations. The Asbestos Abatement Contractor is responsible for creating and maintaining a secure work area during the entire project.
 - b. The Asbestos Abatement Contractor is responsible for maintaining secure entry/exit locations at the facility while work is being completed. The Asbestos Abatement Contractor is responsible for coordinating site security issues with the Owner.
 - c. The Asbestos Abatement Contractor shall maintain a logbook in the clean room areas of all personnel in the regulated area. Anyone who enters the regulated areas must record name, affiliation, time in, and time out for each entry.
 9. **STORAGE**
 - a. Supply temporary storage required for storage of equipment and materials for duration of project. Trailer and storage dumpsters will be maintained in areas designated by the Owner.

E. **WORK AREA PREPARATION**

1. GENERAL
 - a. Before work begins in an area, a decontamination unit must be in operation as outlined in section 01563.
 - b. Completely isolate each work area from other parts of the building (as needed or as necessary) to prevent contamination beyond the isolated area.
 - c. Temporary facilities shall be addressed as outlined in Section 01503.
 - d. Appropriate signage per 29 CFR 1926.1101 shall be posted at entrances, critical barriers, and barrier tape for each asbestos work area.
 - e. The Asbestos Abatement Contractor is responsible for work practices, work plan and safety. Sections 1.02 — 1.08 are for general guidance.
2. NON-FRIABLE REMOVAL - EXTERIOR WINDOW CAULK, EXTERIOR TRANSITE PANELS, INTERIOR WINDOW GLAZING, AND ROOF FLASHING MASTIC
 - a. The Asbestos Abatement Contractor shall erect red asbestos barrier tape around exterior work areas to identify the regulated areas. Appropriate asbestos signs shall be placed on each side of the regulated area and a minimum of every 20 feet. Signs shall be in English and appropriate languages when workers or the general public in the area do not speak fluent English. Only accredited asbestos workers will be allowed inside the regulated areas. Asbestos Contractor shall construct appropriate scaffolding or other methods to access asbestos-containing materials.
 - b. The Asbestos Abatement Contractor shall establish an equipment room or area that is adjacent to the work area for the decontamination of workers and equipment contaminated with asbestos. The decontamination area shall consist of an area covered by an impermeable drop cloth on the floor or horizontal working surface and be of sufficient size as to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area when acceptable by OSHA asbestos regulations. Or a decontamination unit can be in place and operational in close proximity to the regulated area prior to the start of removal operations.
 - c. Install critical barriers on the inside of the building where windows will be removed and over openings into the building or equipment within 30 feet of the work area.
 - d. The Asbestos Abatement Contractor shall cover the ground surface at the side of the building below where roofing materials, windows, and transite window panels are to be removed in the regulated area with one (1) layer of 6-mil (minimum) polyethylene plastic sheeting with joints lapped a minimum of 24 inches and taped securely a minimum of 10 feet out from the building.
 - e. IN during asbestos removal activities non-friable ACM become friable, the Asbestos Abatement Contractor shall immediately stop removal operations and contact the Designer for additional work practice requirements.

F. WORKER PROTECTION

1. GENERAL
 - a. Provide worker protection as required by OSHA, state and local standards applicable to the work. The Asbestos Abatement Contractor is solely responsible for enforcing worker protection requirements at least equal to those specified in this Section.
 - b. Each time the work area is entered the Asbestos Abatement Contractor shall require all persons to remove all street clothes in the changing room of the personnel decontamination unit and put on new disposable coveralls, new head

- cover, and a clean respirator. Alternatively, persons may put on two disposable coveralls over street clothes and a clean respirator. Proceed through shower room to equipment room and put on work boots.
- c. Workers shall not eat, drink, smoke, chew gum or chew tobacco in the work areas, the equipment rooms, the load out areas, or the clean rooms.
 - d. Lighters and matches are not allowed in the work areas, the equipment rooms, the load out areas, or the clean rooms.
2. **WORKER TRAINING**
 - a. Train all workers in accordance with 29 CFR 1926 and North Carolina state regulations regarding the dangers inherent in handling asbestos, breathing asbestos dust, proper work procedures and personal and area protective measures.
 3. **MEDICAL EXAMINATIONS**
 - a. Provide medical examinations for all workers. Examination shall at a minimum meet OSHA requirements as set forth in 29 CFR 1926 and N.C. Workmen's Compensation Act Dusty Trades Examination Record (DEHNR Form 2796).
 4. **PROTECTIVE CLOTHING**
 - a. Provide disposable full-body coveralls and disposable head covers, and require that they be worn by all workers in the work area. Provide a sufficient number for all required changes, for all workers in the work area.
 - b. Boots: Provide work boots with non-skid soles and, where required by OSHA, foot protection for all workers.
 - c. Gloves: Provide work gloves to all workers and require that they be worn at the appropriate times. Do not remove gloves from work area. Dispose of work gloves as asbestos-contaminated waste at the completion of the project.
 - d. Safety Glasses: Provide OSHA approved safety glasses with side shields to be worn at all times in all construction areas.
 - e. Hard Hats: Provide OSHA approved hard hats for the duration of the project. Hard hats should be worn at all times when on the project site.
 5. **ADDITIONAL PROTECTIVE EQUIPMENT**
 - a. Disposable coveralls, head covers and footwear covers shall be provided by the Asbestos Abatement Contractor for the Owner, designer, asbestos air monitoring firm and other authorized representatives who may inspect the job site.
 6. **DECONTAMINATION PROCEDURES**
 - a. Require that workers use the following decontamination procedure as a minimum requirement whenever leaving the work area:
 - 1) Remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.
 - 2) Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:
 - a) Thoroughly wet body including hair and face.
 - b) With respirator still in place; thoroughly wash body, hair, respirator face piece, and all exterior parts of the respirator.
 - c) Take a deep breath; hold it and/or exhale slowly, completely wet hair, face and respirator. While still holding breath, remove respirator and hold it away from face before starting to breathe.
 - d) Carefully wash face piece of respirator inside and out.

- e) Shower completely with soap and water; rinse thoroughly.
 - f) Rinse shower room walls and floor prior to exit.
 - g) Proceed from shower to changing (clean) room and change into street clothes or new disposable work items.
- 3) If the person was wearing multiple disposable coveralls showering may be limited to washing the face, hair, and hands.
- 4) 4. After showering, each employee shall inspect, clean and repair his respirator as needed. The respirator shall be dried, placed in a suitable storage bag and properly stored.

G. RESPIRATORY PROTECTION

1. DESCRIPTION OF WORK

- a. Instruct and train each worker involved in asbestos abatement in proper respirator use and require that each worker always wear a respirator, properly fitted on the face, in the work area from the start of any operation which may cause airborne asbestos fibers until the work area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the workplace or as required for other toxic or oxygen-deficient situations encountered.

2. GENERAL

- a. Provide workers with personally issued and marked respiratory equipment approved by NIOSH and suitable for the asbestos exposure level in the work areas according to OSHA Standard 29 CFR 1926.1101 and other possible contaminants employees might be exposed to during the project.
- b. Provide respiratory protection from the time the first operation involved in the project requires contact with asbestos-containing materials (including construction of decontamination units, construction of airtight barriers/barricades, and placing of plastic sheeting on walls) until acceptance of the final visual clearance by the air monitoring firm.
- c. The minimum respiratory protection for the project during removal of asbestos-containing and asbestos-contaminated materials shall be half-faced air purifying respirators (API).
- d. Respirator fit testing shall be performed as a minimum at the beginning of the project, at any change in respiratory protection equipment, and at any time during the project if requested by the employee or SAM. Fit testing is to be performed by one of the methods listed in the 29 CFR 1926.1101, Appendix C.
- e. Do not allow the use of single-use, disposable or quarter-face respirators for any purpose.

H. DECONTAMINATION UNITS

1. DESCRIPTION OF WORK

- a. Provide separate personnel and equipment/loadout decontamination facilities. Require that the personnel decontamination units be the only means of ingress and egress for the work area. The Asbestos Abatement Contractor shall comply with 29 CFR 1926.1101, specifically paragraph) Hygiene facilities and practices for employees.

2. GENERAL

Provide separate personnel decontamination units and equipment/loadout decontamination units when practical.

- a. Personnel Decontamination Area

- 1) The decontamination area shall consist of an area covered by an impermeable drop cloth on the floor or horizontal working surface and be of sufficient size as to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area when acceptable by OSHA asbestos regulations.
- b. Personnel Decontamination Units
 - 1) As an alternative, a remote decontamination unit can be established. The unit shall consist of a serial arrangement of connected rooms or spaces, changing room, shower room, equipment room. Each shall be separated by a minimum of three curtain doorways. Require all persons without exception to pass through this decontamination unit for entry into and exiting from the work area for any purpose. Do not allow parallel routes for entry or exit. Do not remove equipment or materials through Personnel Decontamination Unit.
 - 2) Provide temporary lighting within decontamination units as necessary to reach an adequate lighting level.
 - 3) Maintain changing floor sanitation by keeping it dry and clean at all times. Do not allow the overflow water from the shower to escape the shower room.
 - 4) Damp wipe all surfaces twice after each shift change with a disinfectant solution.
 - 5) Provide hot and cold water, drainage and standard fixtures including an elevated shower head as necessary for a complete and operable shower. A water hose and bucket is not an acceptable shower.
 - 6) Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the work area.
 - 7) Pump shower waste water to drain. Provide 20 micron and 5 micron waste water filters in line to drain. Change filters daily or more often if necessary.
 - 8) Visual Barriers: Where the area adjacent to the decontamination area is accessible to the public, construct a solid barrier on the public side of a visual barrier of opaque plastic sheeting. Construct barrier with wood or metal studs, max. 16 inches on center, covered with minimum 3/8 inch plywood.
- c. Equipment Decontamination Units:
 - 1) Provide an equipment decontamination unit consisting of a serial arrangement of rooms, with each room separated by a minimum of three curtain doorways, for removal of equipment and material from work areas. Do not allow personnel to enter or exit work areas through equipment decontamination units. The Personnel Decontamination Facility may be used to remove waste from the work area if a separate equipment decontamination unit is not possible based on the work area layout.
 - 2) Washrooms: Provide washrooms for cleaning of bagged or drummed asbestos-containing waste materials passed from the work areas.
 - 3) Holding Areas: Provide holding areas as a drop location for sealed drums and bagged asbestos-containing materials passed from the washrooms.

- 4) Clean Rooms: Provide clean rooms to isolate the holding areas from the building exterior.
- 5) Equipment or Material: Obtain all equipment or material from the work areas through the equipment decontamination units according to the following procedures:
 - a) When passing contaminated equipment, sealed plastic bags, drums or containers into the washroom, close all doorways of the equipment decontamination unit, other than the doorway between the work area and the washroom. Keep all outside personnel clear of the equipment decontamination unit.
 - b) Once inside the washroom, wet-clean the bags and/or equipment.
 - c) When cleaning is complete, insert bagged material into a clean bag/drum during the pass between the washroom and holding area. Close all doorways except the doorway between the washroom and holding area.
 - d) Workers from the building exterior enter the clean room then the holding area to remove decontaminated equipment and/or containers for disposal. Require these workers to wear full protective clothing and respiratory protection as described in Section 01562.
 - e) Bagged material shall be placed in a buggy lined with two layers of six-mil polyethylene sheeting (minimum). Once buggy is full, drape one layer of six-mil polyethylene sheeting over waste in preparation for transport.
- d. Decontamination Unit Contamination: If the air quality in the decontamination unit exceeds 0.01 fibers per cubic centimeter (f/cc) analyzed by PCM or 70 structures per square millimeter (s/mm*) analyzed by TEM or its integrity is diminished through use as determined by the Designer or air monitoring firm, no employee shall use the unit until corrective steps are taken and approved by the Designer and air monitoring firm.

I. PROJECT DECONTAMINATION

1. GENERAL

- a. Carry out a first cleaning of all surfaces of the work area including plastic sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping and/or a HEPA filter vacuum until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces. Do not perform dry-dusting or dry-sweeping.
- b. Equipment shall be cleaned prior to removal from the work area.
- c. At the completion of the cleaning operation, the Asbestos Abatement Contractor's supervisor shall perform a complete visual inspection of the work areas to ensure that the work areas are free of all building material debris and ACM. If the supervisor believes he is ready for a final project inspection, he shall notify the air monitor.
- d. Final inspection for exterior work areas includes a visual inspection only.
- e. The air monitoring firm shall perform the final visual inspection. Discrepancies found shall be documented in the form of a punch list.
- f. Final air sampling shall not commence until the visual inspection is completed and passed. Final air clearances shall meet the requirements of Section 01714.
- g. If the air monitoring firm finds that the work areas have not been adequately decontaminated, cleaning shall be repeated at the Asbestos

- Abatement Contractor's expense, including additional industrial hygiene fees, until the work area is in compliance.
- h. After the work areas are found to be in compliance, the barrier tape and signs shall be removed and any trash and debris shall be disposed of in sealable plastic bags (6 mil minimum) and disposed of as outlined in Section 02084.
 - i. All HEPA unit intakes and exhausts shall be wrapped with six mil polyethylene before leaving the work area.
 - j. After the air monitoring firm has approved the final project decontamination and the Asbestos Contractor has completed the tear down for occupancy by others, the Designer shall perform the project final inspection as outlined in the general conditions.
 - k. Any residual asbestos that may be present after removing critical barriers that in the Designer's judgment should have been cleaned during the pre-cleaning phase prior to installing critical barriers, shall be cleaned and cleared at the Asbestos Contractor's expense.
 - l. There shall be appropriate seals totally enclosing the inspection area to keep it separate from clean areas or other areas where abatement is or will be in progress. Once an area has been accepted and passed air tests, loss of the critical barrier integrity or escape of asbestos into an already clean area shall void previous acceptance and tests. Additional visual and final air clearance sampling shall be required at the Asbestos Contractor's expense.

J. WORK AREA CLEARANCE

1. GENERAL

- a. Notification and scheduling of the final inspection during the project is the responsibility of the Asbestos Abatement Contractor.

2. FINAL CLEARANCE INSPECTION - EXTERIOR WINDOW CAULK, EXTERIOR TRANSITE PANELS, INTERIOR WINDOW GLAZING, AND ROOF FLASHING MASTIC

- a. After the final cleaning operation and after the area is completely dry, the following procedure shall be performed:
 - 1) A final visual inspection of the work areas shall be conducted by the air monitoring firm. If the work area is found visibly clean and dry, the abatement shall be rendered complete.
 - 2) The air monitoring firm shall immediately report the final visual inspection results to the Asbestos Contractor and Designer.

K. ASBESTOS REMOVAL

1. GENERAL

- a. Prior to starting asbestos removal, the Asbestos Abatement Contractor's equipment, work area and decontamination units will be inspected and approved by the designer or air monitoring firm.
- b. All loose asbestos material removed in the work area shall be adequately wet with a surfactant, bagged, sealed and labeled properly before personnel breaks or end of shift. The surfactant to be utilized with asbestos-containing materials identified as "Amosite", shall be a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, mixed in a proportion of one (1) fluid ounce to five (5) gallons of water or as specified by manufacturer. The surfactant to be utilized with asbestos-containing materials identified as "chrysotile", "crocidolite", or types other than Amosite, shall consist of soapy water mixed in a proportion of two (2) fluid ounces of liquid soap to five (5) gallons of water.

- c. All plastic sheeting, tape, cleaning material, clothing and all other disposable material or items used in the work area shall be packed into sealable plastic bags (6- mil minimum) and treated as contaminated material.
 - d. All abated material shall be double-bagged by placing in two 6-mil (minimum) polyethylene bags. The outer bag must be a clear 6-mil (minimum) polyethylene bag. Asbestos- containing or contaminated building debris shall be placed into a dumpster that has been lined with two 6-mil (minimum) layers of polyethylene sheeting.
 - e. All excess water (except shower water) shall be combined with removed material or other absorptive material and properly disposed of as per EPA regulations. Asbestos Abatement Contractor shall not place water in storm drains, onto lawns, or into ditches, creeks, streams, rivers or oceans.
2. SCHEDULE
- a. Project Dates: The project is to commence and conclude on dates as specified or pre- approved by the Owner and designer. The Asbestos Abatement Contractor shall refer to Owner’s schedule. Asbestos Abatement Contractor shall coordinate the phasing of the project with the Owner and designer to achieve this goal.
 - b. Work Hours: Work hours are specified in the Owner’s schedule.
 - c. Workweek: Workweek shall be Monday through Friday, unless otherwise specified or pre- approved by the Owner and designer.
3. SCOPE OF WORK
- a. Removal of NESHAP Category I non-friable ACMs (asbestos-containing materials) shall be performed using non-friable removal techniques. Clean-up of asbestos-containing debris shall be performed using wet methods. Removal of RACMs (regulated asbestos-containing materials) shall be performed using wet methods. Clean -up of asbestos-containing debris shall be performed using wet methods. The Asbestos Abatement Contractor shall adequately wet the ACMs in the work area. Each work area where removal is completed shall remain intact until visual clearance is achieved.
 - b. During this project, the NESHAP Category I non-friable ACN!s to be removed from the building include:
 - 1) Roof flashing mastic
 - c. During this project, the NESHAP Category II non-friable ACMs to be removed from the building include:
 - 1) Exterior transite panels
 - 2) Exterior window caulk
 - d. During this project, materials containing 1% or less asbestos that shall be removed as a NESHAP Category II non-friable ACM include:
 - 1) Interior Window Glazing
4. ASBESTOS REMOVAL - EXTERIOR TRANSITE PANELS, EXTERIOR WINDOW CAULK, AND INTERIOR WINDOW GLAZING
- a. Prior to removal, the Asbestos Abatement Contractor shall erect asbestos barrier tape around the work areas to identify the regulated areas. Proper signage shall be posted per 29 CFR 1926.1101. Only accredited asbestos workers will be allowed inside the regulated areas.
 - b. Drop cloths must be placed within work and staging areas. Place one (1) layer of 6-mil (minimum) polyethylene plastic sheeting with joints overlapped 24 inches and taped securely a minimum of ten feet out from the building.

- c. A decontamination unit must be in place and operational as described in Section 01563.
 - d. The window and transite panel component removal shall be conducted in such a manner that the caulk, glazing and transite panels remains substantially intact/non-friable. Contractor shall not cut ACM with power tools, serrated blades, or other tools that may render the ACM friable.
 - e. Following component removal, wet scrape any residual caulk from window openings.
 - f. Secure the window openings with plywood and caulk so it is watertight if General Contractor cannot immediately install new windows.
 - g. If the General Contractor requests to install new windows immediately behind the abatement contractor, the abatement contractor shall schedule removal so that they do not remove more windows than the General Contractor can put back in a shift.
 - h. If during asbestos removal activities non-friable ACM become friable, the Asbestos Abatement Contractor shall immediately stop removal operations and contact the Designer for additional work practice requirements.
5. ASBESTOS REMOVAL - ROOF FLASHING MASTIC
- a. Prepare work area as set forth in Section 01526.
 - b. After work area preparation is complete, The Asbestos Abatement Contractor shall adequately wet ACM with a fine mist of amended water. Care shall be taken not to over- saturate and allow excess runoff from the work area.
 - c. The Asbestos Abatement Contractor shall carefully remove manageable sections of ACM and place it directly into properly lined and demarcated containers/trucks for disposal.
 - d. Asbestos Abatement Contractor shall remove ACM using hand tools and wet methods. No mechanical hand tools will be allowed for removal of asbestos-containing materials.
 - e. Asbestos Abatement Contractor shall continue misting asbestos-contaminated debris with amended water throughout the removal process. No visible emissions shall be observed.
 - f. Asbestos Abatement Contractor shall clean work area as required by Section 01711.
 - g. If during asbestos removal activities non-friable materials become friable, the Asbestos Abatement Contractor shall immediately stop removal operations and contact the Designer for additional work practice requirements.
- L. DISPOSAL OF ASBESTOS-CONTAINING WASTE MATERIAL
1. GENERAL
- a. ACNI shall be properly sealed and protected, and the asbestos waste dumpster shall be enclosed (i.e. metal roof), shall remain locked while located on the facility site, and then transported to a predesignated disposal site in accordance with 40 CFR 61.150 and DOT 49 CFR Parts 100-399.
 - b. An enclosed dumpster shall be used to haul waste material to the disposal site. No rental vehicles or trailers shall be used. Vehicle selection, vehicle covers, and work practices shall assure that no asbestos becomes airborne during the loading, transport and unloading activity, and that material is placed in the waste site without breaking any seals.
 - c. Waste disposal polyethylene bags (6 mil minimum) and containers, non-porous (steel/plastic) drums or equivalent, with labels, appropriate for storing asbestos waste during transportation to the disposal site shall be used. In addition to the

- OSHA labeling requirements, all containers shall be labeled with the name of the waste generator and the location at which the waste was generated.
- d. The Asbestos Abatement Contractor shall transport the containers and bags of waste material to the approved waste disposal site. The sealed plastic bags shall be placed into the burial site unless the bags have been broken or damaged. Upon the landfill's approval, damaged bags shall be left in the non-porous containers and the entire contaminated package shall be buried. Uncontaminated containers may be reused.
 - e. Workers loading and unloading the asbestos will wear respirators and disposable clothing when handling material. Asbestos warning signs shall be posted during loading and unloading of asbestos waste.
 - f. The Asbestos Abatement Contractor shall use the HHCU's Waste Shipment Record for disposal records as per 40 CFR 61.150 and distribute a copy of all waste shipment records to the designer after the completion of the project as described in Section 01043 Part 1.04.
- M. Pre-work Asbestos Inspection Checklist

PRE-WORK ASBESTOS INSPECTION CHECKLIST

Name of Facility: _____

Project Name: _____

Project ID Number: _____

Date of Inspection: _____ Pass: _____ Fail: _____

| A. DOCUMENTS | YES | NO |
|--|------------|-----------|
| 1) Asbestos Removal Permit/NESHAP Notification | _____ | _____ |
| 2) Accreditation Documents for Workers & Supervisors | _____ | _____ |
| 3) Asbestos Plans and Specifications | _____ | _____ |
| 4) Air Monitoring Data | _____ | _____ |
| 5) Waste Shipment Records | _____ | _____ |
| 6) Sign-in Sheets and Bound Book for Comments | _____ | _____ |
| 7) Calibration Record for Grade "D" Air | _____ | _____ |
| 8) Items listed in Section 01043 of Specification | _____ | _____ |
| | | |
| B. PPE SUPPLIES | | |
| 1) Tyvek Clothing | _____ | _____ |
| 2) Rubber Boots | _____ | _____ |
| 3) Respirators with HEPA Filters | _____ | _____ |
| | | |
| C. CLEAN ROOM | | |
| 1) Entry Curtains | _____ | _____ |
| 2) Emergency Phone Numbers Posted | _____ | _____ |
| 3) First Aid Kit | _____ | _____ |
| 4) Asbestos Signs | _____ | _____ |
| 5) Decontamination Procedures Posted | _____ | _____ |
| 6) Fire Extinguisher | _____ | _____ |
| | | |
| D. SHOWER ROOM | | |
| 1) Polyethylene Curtains | _____ | _____ |
| 2) Hot/Cold Water & Operational | _____ | _____ |
| 3) Soap & Towels | _____ | _____ |
| 4) Waste Water Filter Pump Operational | _____ | _____ |
| 5) Extra Five Micron Size Filters | _____ | _____ |
| 6) Filtered Waste Water to Sanitary Sewer | _____ | _____ |

| E. WORK AREA | YES | NO |
|--|------------|-----------|
| 1) Removable Items Out of Area | _____ | _____ |
| 2) Non-removable Items Protected | _____ | _____ |
| 3) Critical Barriers Installed | _____ | _____ |
| 4) Polyethylene Curtains | _____ | _____ |
| 5) Polyethylene on Walls/Floors as Specified | _____ | _____ |
| 6) HVAC off | _____ | _____ |
| 7) Air Filtration Devices in Place and Operational | _____ | _____ |
| 8) Air Exhausted to Outside | _____ | _____ |
| 9) Electricity Locked and Tagged Out | _____ | _____ |
| 10) Temporary Power Installed with GFCI | _____ | _____ |
| 11) Fire Extinguishers | _____ | _____ |
| 12) Emergency and Fire Exits Marked | _____ | _____ |
| 13) Audible Alarms Operational | _____ | _____ |
| 14) Toilet Available | _____ | _____ |

| F. EQUIPMENT | | |
|--|-------|-------|
| 1) Safety Equipment | _____ | _____ |
| 2) HEPA Vacuums | _____ | _____ |
| 3) Waste Disposal Bags | _____ | _____ |
| 4) Airless Sprayer with Water Source | _____ | _____ |
| 5) Cleaning Equipment | _____ | _____ |
| 6) Glove Bags | _____ | _____ |
| 7) Emergency Power Generator (if required) | _____ | _____ |
| 8) Temporary Lighting | _____ | _____ |

| G. OTHER | | |
|-----------------|-------|-------|
| 1) _____ | _____ | _____ |
| 2) _____ | _____ | _____ |
| 3) _____ | _____ | _____ |
| 4) _____ | _____ | _____ |

Asbestos Design Consultant

Date

Asbestos Abatement Contractor's Representative

Date

SECTION 02 83 10

LEAD HAZARD RENOVATION ACTIVITIES

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. Renovation work requirements at surfaces and areas where lead-containing and lead-based paints and coatings are present.
- B. Related Requirements:
 - 1. Section 02 41 19 - Selective Demolition, for demolition requirements for the Project.
 - 2. Section 09 90 00 - Painting and Coating.

1.3 REFERENCES

- A. US Environmental Protection Agency (EPA).
 - 1. EPA's Renovation, Repair, and Painting Program (RRP).
- B. US Occupational Safety and Health Administration (OSHA):
 - 1. OSHA 29 CFR 1926.62 - Lead.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
 - 2. Coordinate the requirements of this Section with Project renovation work activities.
- 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. Review the work requirements, project conditions, sequencing, application procedures, quality control, testing and inspection and production schedule.

1.5 SEQUENCING AND SCHEDULING

- A. Indicate the work of this Section in Construction Progress Schedule.

1.6 SUBMITTALS

- A. Submit information regarding implementation of EPA's RRP Program. Information to include, but is not limited to, the following:
 - 1. Certifications and worker training requirements. Include Firm's and Certified Renovator's certifications.
 - 2. Procedures to be employed for complying with EPA's Renovation, Repair, and Painting (RRP) Program. Include information regarding occupant and worker protection, work area containment, waste handling, cleaning, and post-renovation cleaning verification.

1.7 CLOSEOUT SUBMITTALS

- A. Submit documentation of RRP Program compliance.
 - 1. Record keeping and reporting requirements.
 - 2. Post-renovation cleaning verification.
 - 3. Submit project closeout Record Documents.

1.8 PROJECT CONDITIONS

- A. Owner will occupy portions of the site immediately adjacent to the areas of work requirements indicated in this Section.
- B. Conduct the work as to not disrupt Owner's operations. Provide notice to Owner not less than 72 hours prior to beginning activities that will affect Owner's operations.
- C. Owner assumes no responsibility for actual condition of structures and areas where the work of this Section is to be performed. Conditions existing at time of inspection for bidding purposes will be maintained by Owner to the extent practical.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 RENOVATION, REPAIR, AND PAINTING (RRP) REQUIREMENTS

- A. Contractor is required to contract with professionals certified and licensed in accordance with Federal, State, and Local regulatory requirements for performance of renovation, repair, and painting (RRP) work where lead-containing materials (LCM) are present.
- B. The RRP work is to be performed in accordance with EPA's current Renovation, Repair and Painting (RRP) Program (including all related amendments), and OSHA's current 29 CFR 1926.62 - Lead. EPA's RRP Program and rules are provided for under Section 402 of the Toxic Substances Control Act (TSCA).
- C. EPA RRP Program certification requirements include, but are not limited to, the following:
 - 1. Firm Certification: Federal law requires all renovation, repair, and painting firms (including sole proprietorships) performing work in accordance with the RRP Program, to be certified. Firm certification is a key requirement to ensure the training of individuals and the use of lead-safe work practices.
 - 2. Firms performing renovations work are to ensure that:
 - a. An EPA Certified Renovator is assigned to each renovation and performs all the Certified Renovator responsibilities.
 - b. All individuals performing RRP activities are either Certified Renovators or have been trained by a Certified Renovator.
 - c. All renovations performed by the firm are performed in accordance with the lead-safe work practice standards of the RRP Program.
 - d. Pre-renovation education and lead pamphlet distribution requirements of the RRP Program are performed.
 - e. Compliance is maintained with the RRP Program's recordkeeping requirements.
- D. Contractor is responsible for Occupational Safety and Health Administration (OSHA) monitoring.

END OF SECTION

SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

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. Formwork for cast-in place concrete.
 - 2. Shoring, bracing, and anchorage.
 - 3. Form accessories.
 - 4. Form stripping.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete.
 - 2. Section 04 20 00 - Unit Masonry: Product requirements for masonry accessories for placement by this Section.
 - 3. Section 05 50 00 - Metal Fabrications: Product requirements for metal fabrications for placement by this Section.

1.3 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010, Reapproval 2015.
 - 2. ACI 301 - Specifications for Structural Concrete; 2020.
 - 3. ACI 318 - Building Code Requirements for Structural Concrete; 2019, Errata 2021.
 - 4. ACI 347R - Guide to Formwork for Concrete; 2014, Errata 2017.
- B. American Forest and Paper Association (AF&PA):
 - 1. AF&PA - National Design Specifications for Wood Construction.
- C. ASTM International (ASTM):
 - 1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.
- D. National Institute of Standards and Technology (NIST):
 - 1. PS 1 - Structural Plywood; 2009, Revised 2019.
 - 2. PS 20 - American Softwood Lumber Standard; 2020, Revised 2021.
- E. West Coast Lumber Inspection Bureau (WCLIB):
 - 1. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17, 2018.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 - 1. Submit formwork, shoring, and reshoring shop drawings.
 - 2. Indicate the following:

- a. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.
 - b. Sequence and timing of erection and stripping assumed compressive strength at time of stripping, height of lift and height of drop during placement.
 - c. Procedure and schedule for removal of shores and installation and removal of reshores.
- C. Product Data: Submit data on void form materials and installation requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 347, ACI 301 and ACI 318.
- B. For wood products furnished for work of this Section, comply with AF&PA.
- C. Design formwork under direct supervision of Professional Engineer experienced in design of concrete formwork and licensed in State of North Carolina.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Products storage and handling requirements.
- B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.7 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct forms to achieve concrete work that complies with design with respect to shape, lines, dimensions, and finish.
- C. Chamfer outside corners of beams, joists, columns, and walls, unless indicated otherwise.
- D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
- E. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

2.2 WOOD FORM MATERIALS

- A. Lumber Forms: Comply with PS 20. Lumber to be labeled with grade and trademark as complying with referenced standards.
 - 1. Application: Use for edge forms and unexposed finish concrete.
 - 2. Boards: Comply with WCLIB (GB) grading rules for "Standard" grade, Douglas Fir.
 - a. 6 inches or 8 inches in width; ship lapped or tongue and groove; surfaced on four (4) sides.
- B. Plywood Forms: Comply with PS 1. Panels to be labeled with grade and trademark as complying with referenced standards.

1. Application: Use for exposed finish concrete.
2. Size: Full size 4 x 8 feet panels.
3. Form Panels for Concrete to Receive Membrane Waterproofing: Structural I, C-D Veneer, Class I, and Exterior grade; 5/8 inch minimum thickness.
4. Form Panels for Concrete to Receive "Smooth Finish": B-D Veneer, High Density Overlay (HDO), Class I, and Exterior grade; 3/4 inch minimum thickness.

2.3 PREFABRICATED FORMS

- A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

2.4 FORMWORK ACCESSORIES

- A. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
- B. Bituminous Joint Filler: ASTM D1751.
- C. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.
- C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

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. Earth Forms:
 1. Trench earth forms neatly, accurately, and at least 2 inches wider than footing widths indicated on Drawings.
 2. Trim sides and bottom of earth forms.
 3. Construct wood edge strips at top of each side of trench to secure reinforcing and prevent trench from sloughing.
 4. Form sides of footings where earth sloughs.
 5. Tamp earth forms firm and clean forms of debris and loose material before depositing concrete.
- C. Formwork - General:

1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
 2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
 3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
 4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
 5. Complete wedging and bracing before placing concrete.
- D. Forms for Smooth Finish Concrete:
1. Use steel, plywood or lined board forms.
 2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
 3. Install form lining with close-fitting square joints between separate sheets without springing into place.
 4. Use full size sheets of form lines and plywood wherever possible.
 5. Tape joints to prevent protrusions in concrete.
 6. Use care in forming and stripping wood forms to protect corners and edges.
 7. Level and continue horizontal joints.
 8. Keep wood forms wet until stripped.
- E. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301 and ACI 318.
- F. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

3.4 APPLICATION - FORM RELEASE AGENT

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- C. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- D. Do not apply form release agent where concrete surfaces are indicated to receive finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
- E. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.5 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install formed openings for items to be embedded in or passing through concrete work.
- C. Locate and set in place items required to be cast directly into concrete.
- D. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

- E. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- F. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.
- G. Construction Joints:
 - 1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
 - 2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
 - 3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
 - 4. Arrange joints in continuous line straight, true and sharp.
- H. Embedded Items:
 - 1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
 - 2. Do not embed wood or uncoated aluminum in concrete.
 - 3. Obtain installation and setting information for embedded items furnished under other Specification sections.
 - 4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
 - 5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.
- I. Openings for Items Passing Through Concrete:
 - 1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
 - 2. Coordinate work to avoid cutting and patching of concrete after placement.
 - 3. Perform cutting and repairing of concrete required as result of failure to provide required openings.
- J. Screeds:
 - 1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
 - 2. Slope slabs to drain where required or as shown on Drawings.
 - 3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.
- K. Scream Supports:
 - 1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane.
 - 2. Staking through membrane is not be permitted.

3.6 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect/Engineer.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- D. Leave forms in place for minimum number of days as specified in ACI 347.

3.8 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Construct formwork to maintain tolerances required by ACI 301 and ACI 318.

3.9 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.
- D. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel reinforcing bars.
 - 2. Steel welded wire fabric.
 - 3. Reinforcement accessories.
- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.
 - 3. Division 26 - Electrical as related to bonding and grounding requirements.

1.2 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 301 - Specifications for Concrete Construction; 2016.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete; 2019, Errata 2021.
 - 3. ACI SP-66 - ACI Detailing Manual; 2004.
- B. ASTM International (ASTM):
 - 1. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
 - 2. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- C. American Welding Society (AWS):
 - 1. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, Amendment 2020.
 - 2. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, Errata 2022.
- D. Concrete Reinforcing Steel Institute (CRSI):
 - 1. CRSI (DA4) - Manual of Standard Practice; 2009.
- E. The Masonry Society (TMS):
 - 1. TMS 402/602 - Building Code Requirements and Specification For Masonry Structures; 2016.

1.3 COORDINATION

- A. Division 01 Administrative Requirements: Coordination and project conditions.
- B. Coordinate with placement of formwork, formed openings and other Work.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Indicate bar sizes, spacings, locations, and quantities of reinforcing steel, bending and cutting schedules, and supporting and spacing devices.
- C. Certificates:

1. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
2. AWS qualification certificate for welders employed on the Work.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI (DA4), ACI 301 and ACI 318.
 1. Maintain one copy of each document on project site.

1.6 QUALIFICATIONS

- A. Welders: Certified as AWS qualified within previous 12 months.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M; 60 ksi yield strength, steel bars, deformed, unfinished.
- B. Steel Welded Wire Reinforcement (WWR): ASTM A1064/A1064M; in flat sheets or coils; unfinished.

2.2 ACCESSORY MATERIALS

- A. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
- B. 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.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic tipped steel type; size and shape to meet Project conditions.

2.3 FABRICATION

- A. Fabricate concrete reinforcement in accordance with CRSI (DA4).
- B. Form standard hooks for 90 degree bend as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters in accordance with ACI 318.
- D. Fabricate column reinforcement with offset bends at reinforcement splices.
- E. Welding of reinforcement is not permitted, unless indicated on Drawings or approved by Architect.
 1. If welding of reinforcement is indicated on Drawings or otherwise approved by Architect, perform welding in accordance with AWS D1.4/D1.4M.
 2. Galvanized or Epoxy Coated Reinforcement: Clean surfaces, weld and re-protect welded joint in accordance with CRSI (DA4).
- F. Locate reinforcement splices not indicated on Drawings, at point of minimum stress. Review location of splices with Architect.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting 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 PLACEMENT

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
 - 1. Do not weld crossing reinforcement bars for assembly.
- C. Do not displace or damage vapor barrier.
- D. Accommodate placement of formed openings.
- E. Space reinforcement bars with minimum clear spacing in accordance with ACI 318, but not less than 1 inch.
 - 1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.
- F. Maintain concrete cover around reinforcement in accordance with ACI 318.
- G. Splice reinforcing where indicated on Drawings in accordance with splicing device manufacturer's instructions.
- H. Bond and ground all reinforcement to requirements of Division 26 - Electrical as related to bonding and grounding requirements.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements.
- B. Install reinforcement within the tolerances specified in TMS 402/602 for foundation walls.

3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.
- B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318.
- C. Provide free access to Work and cooperate with appointed firm.
- D. Reinforcement Inspection:
 - 1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
 - 2. Welding: Inspect welds in accordance with AWS D1.1/D1.1M.
 - 3. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

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. Footings.
 - 2. Slabs on grade.
 - 3. Mechanical equipment pads and housekeeping pads.
 - 4. Control, expansion, and contraction joint devices.

1.2 REFERENCES

- A. American Concrete Institute (ACI):
 - 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 (ASTM):
 - 1. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - 2. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
 - 3. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 4. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - 5. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
 - 6. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
 - 7. ASTM C150/C150M - Standard Specification for Portland Cement.
 - 8. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete.
 - 9. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
 - 10. ASTM C231/C231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 - 11. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
 - 12. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete.
 - 13. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
 - 14. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
 - 15. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
 - 16. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

17. ASTM D1752 - Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
18. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.
19. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
20. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
21. ASTM F1249 - Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

1.3 SUBMITTALS

- A. Section 01 33 00 - 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.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Closeout Procedures: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.5 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.

1.6 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 C150/C150M, 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 C618, Type C or F.
 - 1. Maximum allowable loss on ignition: 4.0 percent.
- C. Water: Potable.
- D. Aggregates:
 - 1. Normal weight concrete: ASTM C33/C33M, uniformly graded as follows:
 - a. Class: Moderate weathering region, but not less than 3M.
 - b. Normal Maximum Aggregate Size:
 - 1) Slabs on Grade: 1 inch.
 - 2) Footings and Walls: 3/4 inch.
 - 2. Lightweight Aggregate: ASTM C330/C330M, 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 C260/C260M and certified by manufacturer for compatibility with other mix components.
- G. Water-Reducing Admixture: ASTM C494/C494M, Type A.
- H. Water-Reducing, Retarding Admixture: ASTM C494/C494M, Type D.
- I. Water-Reducing and Accelerating Admixtures: ASTM C494/C494M, Type E.

2.2 REINFORCEMENT

- A. Deformed Reinforcement: ASTM A615/A615M; 60 ksi yield strength, steel bars, unfinished.
- B. Welded Plain Wire Fabric: ASTM A185; in flat sheets.

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: Manufactured with prime, virgin, polyolefin resins.
 - 1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene is prohibited.
 - a. Thickness:
 - 1) 15 mil.
 - 2. Permeance: Less than 0.01 Perms [grains/(ft² · hr · inHg)], tested in accordance with ASTM E1745 Section 7.1; testing conditions allowing for ASTM F1249 or ASTM E96/E96M test methods.
 - 3. Puncture Resistance: 2,266 grams minimum, tested in accordance with ASTM D1709.
 - 4. Tensile Strength: 70.6 lbf/in minimum, tested in accordance with ASTM D882.

5. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
 - a. Seam Tape: Low permeance tape composed of a high-density polyethylene film and a rubber based, pressure-sensitive adhesive.
 6. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. Stego Wrap Vapor Barrier; Stego Industries, LLC.
- B. Non-shrink Grout: ASTM C1107/C1107M.
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 C171, 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 C309, 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; Colloid Environmental Technologies Co.
 - b. Conseal CS-231; Concrete Sealants Inc.
 - c. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.
 - d. Hydrotite; Greenstreak.
 - e. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
 - f. Adeka Ultra Seal; Mitsubishi International Corporation.
 - g. 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 D1751.
 2. Exterior - Sponge rubber type: ASTM D1752, 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 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 3/4 inch maximum aggregate size.
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch or 3/4-inch nominal maximum aggregate size.
5. Water-Cementitious Ratio: 0.40.

2.7 CONTROL OF MIX IN THE FIELD

- A. 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.
- B. 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.
- C. Do not use batches that exceed tolerances.

2.8 CONCRETE MIXING

- A. Transit Mixers: Mix concrete materials in transit mixers, complying with requirements of ASTM C94/C94M.
- B. At ambient temperatures of 85 to 90 degrees F, reduce mixing and delivery time to 75 minutes.
- C. At ambient temperatures above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 31 00 - 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 non-shrink 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.
- 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 exceeding 3 feet shall be permitted. For falls exceeding 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 as indicated.
- 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.

3.4 FINISHING FORMED SURFACES

- A. Repairs, General: Repair surface defects, including tie holes, immediately after removing formwork.
 - 1. Remove honeycombed areas and other defective concrete down to sound concrete, cutting perpendicular to surface or slightly undercutting. Dampen patch location and

- area immediately surrounding it prior to applying bonding compound or patching mortar.
- 2. Before bonding compound has dried, apply patching mixture matching original concrete in materials and mix except for omission of coarse aggregate, and using a blend of white and normal portland cement as necessary to achieve color match. Consolidate thoroughly and strike off slightly higher than surrounding surface.
- B. Unexposed Form Finish: Repair tie holes and patch defective areas. Rub down or chip off fins or other raised areas exceeding 1/4 inch height.
- C. Exposed Form Finish: Repair and patch defective areas, with fins or other projections completely removed and smoothed.
 - 1. Smooth rubbed finish: Apply to surfaces indicated no later than 24 hours after form removal.
 - a. Wet concrete surfaces to be finished and rub with Carborundum brick or other abrasive until uniform color and texture are achieved.
 - b. Do not apply separate grout mixture.
 - 2. Contiguous unformed surfaces: Strike smooth and float to a similar texture tops of walls, horizontal offsets, and other unformed surfaces adjacent to or contiguous with formed surfaces. Continue final finish of formed surfaces across unformed surfaces, unless otherwise specifically indicated.

3.5 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 F_F50 (floor flatness), F_L30 (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.
- 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: 1 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 manufacturer's recommendation for surface preparation.

3.6 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 exceeding 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.

3.7 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 non-shrink grout.
 - 2. Use nonmetallic grout for exposed conditions, unless otherwise indicated.
- C. Reinforced Masonry: Provide concrete grout for reinforced masonry where indicated on drawings and as scheduled.

3.8 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.

3.9 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Composite Sampling, and Making and Curing of Specimens: ASTM C172/C172M and ASTM C31/C31M.
 - 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 C143/C143M. One test per strength test and additional tests if concrete consistency changes.
 - 1. Modify sampling to comply with ASTM C94/C94M.
- C. Air Content of Normal Weight Concrete: ASTM C173/C173M or ASTM C231/C231M. One test per strength test performed on air-entrained concrete.
- D. Air Content of Lightweight Concrete: ASTM C173/C173M. One test per strength test performed on air-entrained concrete.
- E. Approximate Air-Dry Weight of Lightweight Concrete: ASTM C567. 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 C39/C39M.
 - 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 are 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 acceptable if all 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 C42/C42M, 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.
 - 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; 2016.

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; 2018.
 - 2. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2021.
 - 3. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
 - 4. ASTM C150/C150M - Standard Specification for Portland Cement; 2021.
 - 5. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
 - 6. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
 - 7. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar; 2017.
 - 8. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
 - 9. ASTM C476 - Standard Specification for Grout for Masonry; 2020.
 - 10. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2020.
 - 11. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
 - 12. ASTM C1019 - Standard Test Method for Sampling and Testing Grout; 2013.
 - 13. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2019.
 - 14. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2021.
 - 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.
 - 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; 2021.
- B. The Masonry Society (TMS):
 - 1. TMS 402/602 - Building Code Requirements and Specification For Masonry Structures; 2016.

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:
 - 1. Standard Masonry Mortar: Submit three samples of manufacture's full range of colors.
 - 2. Colored Masonry Mortar: Submit two sample sets of manufacture's full range.
- D. 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.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. 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 where 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(s):
 - a. Colors:
 - 1) Three colors as selected by Architect from manufacture's full range.
 - b. Locations:
 - 1) As indicated on Drawings.
- 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: Mortar and grout.
 - 3. Section 04 72 00 - Cast Stone Masonry.
 - 4. Section 05 12 00 - Structural Steel: Product requirements for steel anchors for placement by this Section.
 - 5. Section 05 21 00 - Steel Joists: Product requirements for steel bearing pads for joists for placement by this Section.
 - 6. Section 05 50 00 - Metal Fabrications: Product requirements for loose steel lintels and fabricated steel items for placement by this Section.
 - 7. Section 05 40 00 - Cold Formed Metal Framing: Product requirements for steel bearing pads for trusses placed by this Section.
 - 8. Section 07 11 00 - Dampproofing: Dampproofing masonry surfaces.
 - 9. Section 07 21 19 - Foamed-In-Place Insulation: For veneer wall cavity spaces.
 - 10. Section 07 62 00 - Sheet Metal Flashing and Trim: Product requirements for reglets for flashings for placement by this Section.
 - 11. Section 07 84 00 - Firestopping: Firestopping at penetrations of masonry work.
 - 12. Section 07 90 00 - Joint Protection: Rod and sealant at control and expansion joints.
 - 13. Section 07 95 13 - Expansion Joint Cover Assemblies.
 - 14. Division 08 - Openings: Multiple types of opening frames to be 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, with changes through 2017.

- B. ASTM International (ASTM):
 - 1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
 - 2. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
 - 3. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
 - 4. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016, with changes through 2018.
 - 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; 2021a.

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; 2017.
 9. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2017.
 10. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2021.
 11. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.
 12. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.
 13. ASTM C142/C142M - Standard Test Method for Clay Lumps and Friable Particles in Aggregates; 2017.
 14. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2021.
 15. ASTM C641 - Standard Test Method for Iron Staining Materials in Lightweight Concrete Aggregates; 2017.
 16. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength; 2019.
 17. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar; 1992a, changes through 2014.
 18. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2021.
 19. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.
 20. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2020.
 21. ASTM D2287 - Standard Classification System and Basis for Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds; 2019.
 22. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2022.
 23. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
 24. 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; 2016.
- 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 are as follows:
 - 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 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.

1.8 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 where 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 indicate 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. Single scored vertically where indicated on Drawings.
- 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 <1
 - b. Clay Lumps (%): ASTM C142/C142M <2
 - c. Stain Test (Index): ASTM C641 No Stain
 - 2. Compressive Strength: As indicated on Drawings, but not less than 2,000 PSI.
 - 3. Single scored vertically where indicated on Drawings.
- 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 <1
 - b. Clay Lumps (%): ASTM C142/C142M <2
 - c. Stain Test (Index): ASTM C641 No Stain
 - 2. Compressive Strength: As indicated on Drawings, but not less than 2,000 PSI.
 - 3. Single scored vertically where indicated on Drawings.
- 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. Single scored vertically where indicated on Drawings.
- 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: Old Castle.
 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 indicate 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 and Color: All surfaces exposed-to-view are to be uniform in color and appearance. Damaged or chipped corners or faces are unacceptable.
 - a. As selected by Architect from manufacturer's full range.
 9. Single scored vertically where indicated on Drawings.
 10. Mortar Color: As selected by Architect from manufacturer's full range.
- H. Polished Face Decorative Concrete Masonry Units: Manufactured prefinished polished face on all exposed-to-view surfaces.
1. Basis of Design: Old Castle.
 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 indicate 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 and Color: All surfaces exposed-to-view are to be uniform in color and appearance. Damaged or chipped corners or faces are unacceptable.
 - a. As selected by Architect from manufacturer's full range.
 9. Single scored vertically where indicated on Drawings.
 10. Mortar Color: 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 Products: Subject to compliance with requirements, provide face brick with physical and visual characteristics comparable to the following Basis of Design units, as approved by Architect:
 - a. Face Brick Color - BRK1 (CAM):
 - 1) As selected by Architect from manufacturer's full range.
 - b. Face Brick Color - BRK2 (HES):
 - 1) As selected by Architect from manufacturer's full range.
 - c. Face Brick Color - BRK3 (WES):
 - 1) As selected by Architect from manufacturer's full range.
 - d. Face Brick Color - BRK4 (accent):
 - 1) As selected by Architect from manufacturer's full range.
- 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 C 67.
 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 - 0.030 inch (30 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 wall 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 single 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 indicted 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.
- 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 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 2020.
 - 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 2016a.
 - 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 2020.
 - 9. ASTM A992/A992M - Standard Specification for Structural Steel Shapes 2020.
 - 10. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings 2018, with Editorial Revision.

11. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings 2018, with Editorial Revision.
 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 2021.
- D. American Welding Society (AWS):
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
 2. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, Errata 2021.
 3. 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. National Ornamental & Miscellaneous Metals Association (NOMMA):
1. NOMMA Guideline 1 - Joint Finishes.
- G. 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 - STEEL

- A. Structural W-Shapes: ASTM A992/A992M.
- B. Structural Shapes: ASTM A36/A36M.
- C. Channels and Angles: ASTM A36/A36M.
- D. Steel Plate: ASTM A36/A36M.
- E. Hollow Structural Sections: ASTM A500/A500M, Grade B.
- F. Steel Pipe: ASTM A53/A53M, Grade B, Schedule 40.
- G. Sheet Steel: ASTM A653/A653M, Grade 33 Structural Quality, galvanized with coating class.
- H. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563/563M nuts and ASTM F436/F436M washers.
- I. Structural Bolts, Nuts and Washers: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class B.
- J. Welding Materials: AWS D1.1; type required for materials being welded.
- K. Shop Primer: SSPC Paint 15, Type 1, red oxide.
- L. Touch-Up Primer:

1. Shop Primer: Match shop primer.
2. Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.
3. Interior Anti-Corrosive Paints: Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.

2.2 MATERIALS – ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.
- F. Aluminum -Alloy Die Castings: ASTM B85/B85M.
- G. Bolts, Nuts, and Washers:
 1. Stainless steel.
- H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.3 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.

2.4 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.

2.5 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.

2.6 ANCHOR BOLTS

- A. Anchor Rods: ASTM A307; Grade A.
 - 1. Shape: Hooked and straight.
 - 2. Furnish with nut and washer; unfinished.

2.7 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.

2.8 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.

2.9 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. Specification sections related to roofing curbs, roofing, and roof decking construction.

1.2 REFERENCES

- A. American Wood-Protection Association (AWPA):
 - 1. AWPA U1 - Use Category System: User Specification for Treated Wood; 2022.
- B. ASTM International (ASTM):
 - 1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
 - 2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
 - 3. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood; 2003 (Reapproved 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; 2022.
- C. National Institute of Standards and Technology (NIST):
 - 1. PS 1 - Structural Plywood; 2009 (Revised 2019).
 - 2. PS 2 - Performance Standard for Wood Structural Panels; 2018.
 - 3. PS 20 - American Softwood Lumber Standard; 2020, Revised 2021.
- D. 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 PS 20 and requirements of specified grading agencies.
 - 2. Wood Construction Panels:
 - a. Plywood: Comply with PS 1 and requirements of specified grading agencies.
 - b. Oriented Strand Board (OSB): Comply with 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: 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: PS 1, C-C Plugged or better, Exterior grade.
 - 2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D or better.
 - 3. Other Locations: 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) Exterior rough carpentry items as indicated on Drawings.
 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: AWPA 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 20 00
FINISH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes finish carpentry materials and work not otherwise indicated in other Sections.
 - 1. Finish carpentry items.
 - 2. Wood trim.
 - 3. Wood capped handrails.
 - 4. Hardware and attachment accessories for finish carpentry items not specified in other Sections.

- B. Related Requirements:
 - 1. Section 06 10 53 - Miscellaneous Rough Carpentry: Grounds and support framing.
 - 2. Section 09 90 00 - Painting and Coating: Painting and finishing of finish carpentry items.
 - 3. Section 12 32 16 - Manufactured Plastic-Laminate-Faced Casework: Shop fabricated cabinet work.

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI A135.4 - Basic Hardboard; 2020.
 - 2. ANSI/BHMA A156.9 - Cabinet Hardware; 2020.
 - 3. ANSI A208.1 - Particleboard; 2016.

- B. American National Standards Institute (ANSI) and Decorative Hardwood Association (formerly Hardwood Plywood and Veneer Association (HPVA)):
 - 1. ANSI/HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2020.

- C. American Wood-Protection Association (AWPA):
 - 1. AWPA U1 - Use Category System: User Specification for Treated Wood; 2021.

- D. Architectural Woodwork Institute (AWI):
 - 1. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, Errata 2016.
 - 2. AWI (QCP) - Quality Certification Program; current edition, www.awigcp.org.

- E. ASTM International (ASTM):
 - 1. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
 - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
 - 3. ASTM F1667/F1667M - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2021.

- F. 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.

- G. National Electrical Manufacturers Association (NEMA):
 - 1. NEMA LD 3 - High Pressure Decorative Laminates; 2005.

- H. National Institute of Standards and Technology (NIST):
 - 1. PS 1 - Structural Plywood; 2009, Revised 2019.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Coordination and sequencing work.
- B. Coordinate the work with plumbing rough-in, electrical rough-in, installation of associated and adjacent components.
- C. Sequence work to ensure utility connections are achieved in orderly and expeditious manner.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit the following data:
 - 1. Wood materials to be used in viewable construction.
 - 2. Veneer materials.
 - 3. Fire retardant and preservative treatment materials and application instructions.
 - 4. Finish materials.
 - 5. Attachment hardware, and finish hardware.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, and to minimum scale of 1-1/2 inch equals 1 foot.
 - 1. Provide the information required by AWI/AWMAC/WI (AWS).
- D. Samples for Initial Selection: Two manufacturer's color samples illustrating the full range of finishes, patterns, and colors available for each finish surface type, trim and hardware indicated; submit for Architect's initial selections.
 - 1. For clear coats on stained wood, samples to illustrate range of stain colors and sheens available as applied to wood species required in construction.
 - 2. For clear coats on non-stained wood, samples to illustrate sheens available as applied to wood species required in construction.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, pattern, and color; minimum 4 x 4 inch samples and actual trim and hardware. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Certificates:
 - 1. Submit copy of fabricator's AWI (QCP) - Quality Certification Program license and Project specific letters to the Architect.
 - 2. Submit labels and certificates required by quality assurance and quality control programs.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating products indicated in this Section with minimum five (5) years documented experience.
 - 1. Accredited participant in the specified Quality Certification service/program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification: Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this Section.
 - 1. Provide labels or certificates indicating that the products and work comply with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
 - 2. Provide designated labels on shop drawings as required by certification program.
 - 3. Provide designated labels on installed products as required by certification program.

4. Submit certifications upon completion of installation that verifies the work complies with specified requirements.
- C. Maintain copy of AWI/AWMAC/WI (AWS) on site available for review.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements.
- B. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.
- C. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- D. Protect from moisture damage.
- E. Handle materials and products to prevent damage to edges, ends, or surfaces.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Quality Standard: Products and work of this Section is to comply with the following grade in accordance with AWI/AWMAC/WI (AWS), unless otherwise indicated.
 1. Grade:
 - a. Custom Grade.
 2. Moisture Content for Wood Based Products:
 - a. Interior Use: 6 - 8 percent.
 - b. Exterior Use: 8 - 10 percent.
 3. Quality to be suitable for transparent finish unless indicated otherwise.
- B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by authority having jurisdiction and applicable code.

2.2 COMPONENTS

- A. Softwood Lumber:
 1. Species of Wood:
 - a. Southern Pine.
 2. Cut or Slicing of Wood:
 - a. Rift or Quarter Sawn.
- B. Hardwood Lumber:
 1. Species of Wood:
 - a. Red Oak.
 2. Cut or Slicing of Wood:
 - a. Rift Sawn.
- C. Softwood Plywood: Refer to ACCESSORIES article in this Section for adhesive type.
 1. Core Type:
 - a. Veneer core.
 - 1) Exterior grade for exterior use.
 2. Species of Face Veneer: PS 1 Grade B-B.
 - a. Fir.
 3. Slicing of Face Veneer:
 - a. Rotary Sliced.
- D. Hardwood Plywood: Refer to ACCESSORIES article in this Section for adhesive type.

1. Core Type:
 - a. Veneer core.
 - 1) Exterior grade for exterior use.
 2. Species of Face Veneer: ANSI/HPVA HP-1 Grade A.
 - a. Red Oak.
 3. Slicing of Face Veneer:
 - a. Rotary Sliced.
 4. Matching of Individual Leaves to Each Other: Book matching.
 5. Matching Across Panel Face: Balanced matching.
- E. High Pressure Decorative Laminate (HPDL): NEMA LD 3.
1. High Wear Surfaces: HWS (0.060 inch thick).
 2. Horizontal Surfaces: HGS (0.048 inch thick).
 3. Vertical Surfaces: VGS (0.028 inch thick).
 4. Cabinet Liner Surfaces: CLS (0.02 inch thick).
 5. Concealed Backer Surfaces: BKL (0.02 inch thick) undecorated laminate backer for application to concealed backside of panels faced with HPDL.
 6. Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.
 7. Colors and Finish:
 - a. Vertical Surfaces:
 - 1) As selected by Architect from manufacturer's full range.
 - b. Horizontal Surfaces:
 - 1) As selected by Architect from manufacturer's full range.
- F. Particleboard: Medium density; moisture resistant; not less than Type M-2 exterior glue complying ANSI A208.1; sanded faces.
- G. Hardboard: ANSI A135.4; Pressed wood fiber with resin binder, Class 1 (tempered grade), 1/4 inch thick, smooth one sides (S1S).
- H. Glass Shelves: ASTM C1048, Kind FT Fully tempered, Condition A, uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; with horizontal tempering, arrised edges.
- I. Wood Capped Handrails: Concealed fasteners; shape and configuration as indicated on Drawings.
1. Lumber Species: Hardwood lumber to match adjacent wood trim.
 2. Finish and Color:
 - a. Transparent and stain as selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

- A. Adhesive: Wood-to-wood adhesive used to glue for thickness, width, or lay-up of veneered construction. To be for the intended purpose and to be applied in accordance with the manufacturer's instructions.
 1. Type I: Exterior or non-climate controlled interior applications.
 2. Type II: Interior climate controlled applications.
- B. Shelf Standards and Fitted Supports: Stainless steel; satin finish.
 1. Standards to be formed channels, slotted for fitted supports spaced at 1 inch centers.
- C. Shelf Brackets: Stainless steel; satin finish.
 1. Fabricated with angled extension support, pre-drilled and countersunk fastener holes.
- D. Mirror Attachment Accessories: Stainless steel J-profile channels; satin finish.
- E. Fasteners and Adhesives:

1. Fasteners: Steel of size and type to suit application; hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 - a. Concealed Joint Fasteners: Threaded steel.
 - b. Exterior Fasteners: Length required to penetrate wood substrate 1-1/2 inch.
 - 1) Stainless steel, Grade 304 or 316 and complying with ASTM F1667/F1667M.
 2. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- F. Lumber for Shimming and Blocking: Softwood lumber.
- G. Veneer Edge Band: Standard wood veneer edge band matching face veneer.
- H. Wood Filler: Base type as recommended by manufacturer of finish materials and tintable to match surrounding surface finish.
- I. Primer: Low VOC alkyd primer sealer type.
 1. Interior Primers: Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.

2.4 HARDWARE

- A. Hardware: Comply with ANSI/BHMA A156.9.
1. Hinges: European style, stainless steel, satin finish.
 2. Pulls: Wire style.
 - a. Stainless steel, satin finish.
 3. Drawer Slides: Full suspension style, powder coat finish.
 4. Cabinet Locks: Keyed cylinder, two keys for each lock, master keyed, steel with satin finish.

2.5 WOOD TREATMENT

- A. Factory-Treated Lumber: Comply with requirements of AWWA U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service conditions, and specific applications.
- B. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 1. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
- C. Wood Preservative by Pressure Treatment (PT Type): AWWA U1 Treatment using water borne preservative with 0.25 percent retainage.
- D. Shop pressure treat wood materials requiring fire rating to concealed wood blocking.
- E. Provide identification on fire retardant treated material.
- F. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
- G. Redry wood after pressure treatment to the indicated percent moisture content.

2.6 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate in accordance with PERFORMANCE REQUIREMENTS article of this Section.
- C. Shop assemble work for delivery to site, permitting passage through building openings.

- D. Fit exposed sheet material edges with matching veneer edging. Use one piece for full length only.
- E. Cap exposed high pressure decorative laminate finish edges with material of same finish and pattern.
- F. Shop prepare and identify components for book match grain matching during site erection.
- G. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.
- H. Apply high pressure decorative laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises.
- I. Apply laminate backing sheet to reverse face of high pressure decorative laminate finished surfaces.

2.7 FINISHING

- A. Shop finish items indicated to be shop fabricated and finished for installation at site.
- B. Sand work smooth and set exposed nails and screws.
- C. Apply wood filler to fill recessed nail and screw indentations.
 - 1. On items to receive transparent finishes, tint wood filler to matching surrounding surfaces and of types recommended by manufacturer of applied finishes.
- D. Apply seal coat to concealed wood surfaces in contact with cementitious materials.
- E. Back prime woodwork items to be field finished, prior to installation.
- F. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade indicated in PERFORMANCE REQUIREMENTS article of this Section and as follows:
 - 1. Refer to Section 09 90 00 - Painting and Coating for finishes for interior wood.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify adequacy of backing and support framing.
- C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 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 in accordance with PERFORMANCE REQUIREMENTS of this Section.
- C. Set and secure materials and components in place, plumb and level.

- D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- E. Install trim with finish nails at 12 inches on center.
 - 1. Set, fill and finish over fastener locations to match surrounding finish.
- F. Install hardware.
- G. Site Applied Wood Treatment:
 - 1. Apply preservative treatment.
 - 2. Brush apply one coat of preservative treatment on wood in contact with cementitious materials. Treat site-sawn cuts.
 - 3. Allow preservative to dry prior to erecting members.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Indicated Position: 1/16 inch.
- C. Maximum Offset from Alignment with Abutting Materials: 1/32 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.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.

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 C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015, Reapproval 2022.
 - 2. ASTM D816 - Standard Test Methods for Rubber Cements; 2006, Reapproval 2016.
 - 3. ASTM D1644 - Standard Test Methods for Nonvolatile Content of Varnishes; 2001, Reapproval 2017.
 - 4. ASTM D2370 - Standard Test Method for Tensile Properties of Organic Coatings; 2016, Reapproval 2021.
 - 5. ASTM D2697 - Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings; 2003, Reapproval 2021.
 - 6. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022.

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. - Hydralastic 836 Waterproofing Membrane.

2.2 MATERIALS

- A. Waterproofing Membrane: Single-component, cold-applied, solvent-free, non-shrink, liquid waterproofing membrane.
 - 1. Solids Content by Weight, ASTM C1250: 98 percent.
 - 2. Tensile Strength, ASTM D412: 100 psi.
 - 3. Elongation at Break, ASTM D412: 425 percent.
 - 4. Water Vapor Transmission, ASTM E96 (Method BW): 0.10 perms.
 - 5. Shore 00 Hardness, ASTM D2240: 57.
 - 6. VOC, ASTM D2369: 36 g/L.

2.3 ACCESSORIES

- A. Joint Tape: 6 inches (150 mm) minimum width, reinforcing fabric for corners, crack, and joint treatment.
 - 1. Reinforcing Fabric HCR by W.R. Meadows, Inc. (Basis of Design)
- B. Reinforced Joint Tape for outside corners subject to backfill.
 - 1. Precon Tape by W.R. Meadows, Inc. (Basis of Design)
- C. Detailing Membrane: BEM by W.R. Meadows, Inc. (Basis of Design)
- D. Concrete Repair Materials: Meadow-Patch 5 and Meadow-Patch 20 Concrete Repair Mortars by W.R. Meadows, Inc. (Basis of Design)
- E. Waterproofing Protection Course: Perminator or Protection Course by W.R. Meadows, Inc. (Basis of Design)
- F. Rolled Matrix Drainage System: Mel-Drain by W.R. Meadows, Inc. (Basis of Design)

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. 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.
- J. 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 00
THERMAL INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Board insulation at perimeter foundation walls.
 - a. Exception: Where Drawings indicate foamed-in-place insulation, comply with Section 07 21 19 - Foamed-In-Place Insulation.
 - 2. Batt insulation and vapor retarder in exterior framed walls, ceilings, and soffits.
 - 3. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior walls.
- B. Related Requirements:
 - 1. Division 07 - Thermal and Moisture Protection: Roofing insulation requirements.
 - 2. Section 07 21 19 - Foamed-In-Place Insulation: Plastic foam insulation other than boards.
 - 3. Section 09 21 16 - Gypsum Board Assemblies: Acoustic attenuation insulation for interior construction that does not require a thermal barrier between two conditioned spaces.

1.2 REFERENCE STANDARDS

- A. ASTM International (ASTM):
 - 1. ASTM C272/C272M - Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions; 2018.
 - 2. ASTM C303 - Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation; 2021.
 - 3. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
 - 4. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2019.
 - 5. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
 - 6. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019.
 - 7. ASTM D774/D774M - Standard Test Method for Bursting Strength of Paper; 1997, Reapproval 2007.
 - 8. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2016.
 - 9. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications; 2016.
 - 10. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
 - 11. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
 - 12. ASTM E970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source; 2017.
- B. National Fire Protection Association (NFPA):

1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2019.
- C. Green Seal (GS):
 1. GS-36 - Adhesives for Commercial Use.
- D. South Coast Air Quality Management District (SCAQMD):
 1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Extruded polystyrene board; ASTM C578; and the following characteristics:
 1. Application Locations: Locations as indicated on Drawings and as follows.
 - a. Foundation perimeter, except where Drawings indicate foamed-in-place insulation, comply with Section 07 21 19 - Foamed-In-Place Insulation.
 2. Type (ASTM C578), Minimum Compressive Strength (ASTM D1621), Minimum R-value (ASTM C518, at 75 degrees F mean temperature), Maximum Water Absorption (ASTM C272/C271M, by volume, total immersion) are as follows:
 - a. Type IV, 25 psi, R-value 5.0 per inch, Water Absorption 0.3 percent.
 3. Board Thickness: 3 inches unless indicated otherwise on Drawings.
 4. Flame Spread Index (FSI): Class A, 25 or less, when tested as per ASTM E84.
 5. Smoke Developed Index (SDI): 450 or less, when tested as per ASTM E84.
 6. Comply with fire resistance requirements shown on the drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
 7. Board Edges: Square.
 8. Board Size: 48 x 96 inch, scored at 16 inch increments.
 9. Manufacturers:
 - a. DiversiFoam Products - CertiFoam.
 - b. Dow Chemical - Styrofoam.
 - c. Owens Corning - Foamular XPS.
 - d. Kingspan Insulation, LLC - Green Guard XPS.

2.2 BATT INSULATION MATERIALS

- A. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit.
 1. Unfaced Type: ASTM C665 Type-I (unfaced); rated flame spread / smoke development of 25 / 50, or less, when tested in accordance with ASTM E84).
 - a. Application Locations: Where indicated on Drawings.
 2. Faced Type: ASTM C665 Type-III (faced); Class-A (FSK (foil-scrim-kraft facing)); Category-I (vapor retarder facing); rated flame spread / smoke development of 25 / 50, or less, when tested in accordance with ASTM E84.
 - a. Application Locations: Where indicated on Drawings.

3. Thermal Resistance: Minimum R-value of 4.0 per inch thickness, when tested in accordance with ASTM C518 at 75 degrees F.
 4. Combustion Characteristics: Passes when tested in accordance with ASTM E136.
 5. Fungi Resistance: Passes when tested in accordance with ASTM C1338.
 6. Nominal Density: Minimum 2.5 pcf when tested in accordance with ASTM C303.
 7. Corrosivity to Steel: Passes when tested in accordance with ASTM C665.
 8. Blanket Width: Sized to fully friction fit space between framing members.
 9. Blanket Thickness: Sized to fully friction fit cavity, but not less than 3-1/2 inches.
 10. Manufacturers:
 - a. Johns Manville.
 - b. Knauf Insulation.
 - c. Owens Corning.
 - d. Rockwool.
- B. Vapor Retarder Sheet: Polyethylene film complying with ASTM D4397.
1. Application Locations: Where indicated on Drawings.
 2. Color:
 - a. Clear.
 3. Thickness:
 - a. 6 mils (0.006 inch) (0.1524 mm).
 4. Water Vapor Permeance:
 - a. For 6 mil Sheet Thickness: 0.13 perms complying with ASTM D4397.
 5. Seam and Perimeter Tape: Polyethylene self-adhering type, mesh reinforced, 2 inches (50 mm) wide, compatible with sheet material.

2.3 ACCESSORIES

- A. Aluminum Foil Tape: Bright aluminum self-adhering type, mesh reinforced, minimum 2 inches wide, and as recommended by insulation manufacturer.
- B. Tape For Rigid Insulation Boards: Joint tape material to be in accordance with insulation material manufacturers' instructions.
- C. Adhesive: Type recommended by insulation manufacturer for application.
 1. Interior Adhesives: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
 2. Interior Aerosol Adhesives: Maximum volatile organic compound content in accordance with GS-36.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- C. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

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. Board Insulation at Foundation Perimeter: (Exception: Where Drawings indicate foamed-in-place insulation, comply with Section 07 21 19 - Foamed-In-Place Insulation.)
 - 1. Adhere strip of polyethylene sheet over control joint with double beads of adhesive each side of joint between sheets. Extend sheet full height of joint.
 - 2. Apply adhesive in three continuous beads per board length. Daub adhesive tight to protrusions to ensure continuity of vapor retarder and air seal.
 - 3. Install boards horizontally on foundation perimeter.
 - a. Place boards to maximize adhesive contact.
 - b. Install in running bond pattern.
 - c. Butt edges and ends tightly to adjacent boards and to protrusions.
 - 4. Extend boards over expansion joints, unbonded to foundation on one side of joint.
 - 5. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
 - 6. Where cavity exists between installed foundation insulation boards and back of masonry veneer and cavity is indicated to be grouted solid, protect cavity from intrusion of soil and/or other debris. Install grout in cleaned cavity within 48 hours of masonry veneer installation.
- C. Batt Insulation:
 - 1. Install insulation in accordance with manufacturer's instructions.
 - 2. Install in exterior wall, soffit spaces, ceiling spaces and other locations indicated on Drawings without gaps or voids. Do not compress insulation.
 - 3. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
 - 4. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
 - 5. Faced Batt Insulation: Install with factory applied face facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
 - 6. Tape insulation batts in place.
 - 7. Tape and seal butt ends, lapped flanges, and minor tears or cuts in membrane.
- D. Vapor Retarder Sheet:
 - 1. Install vapor retarder sheet in accordance with manufacturer's instructions.
 - 2. Metal Framing: Where indicated on Drawings only and in conjunction with batt insulation installation, place vapor retarder sheet on warm side of building spaces; lap and seal vapor retarder sheet joints over face of framing members (framing members will provide solid backing to facilitate applying appropriate pressure for tape adhesion).
 - 3. Extend vapor retarder sheet tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape and seal in place.
 - 4. Tape and seal minor tears or cuts in vapor retarder sheet.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit installed insulation to be damaged prior to its concealment.

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; 2021a.
 - 3. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission of Materials; 2022.
 - 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; 2019.

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 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures.
- B. Product Data: Submit data on material characteristics, performance criteria, and limitations.
- C. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.
- D. Manufacturer's qualification statement.
- E. 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. Primer: 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 50 00.10

ROOFING - GENERAL REQUIREMENTS

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.
- B. Applicable parts of other technical specifications that require coordination with the work specified in this Section also apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Roofing General Requirement in addition to Division 01 - General Requirements.
- B. Related Requirement:
 - 1. Section 01 21 00 - Allowances: Allowances related to roofing work.
 - 2. Section 01 22 00 - Unit Prices: Unit Prices related to roofing work.

1.3 WORK SUMMARY

- A. The work generally includes:
 - 1. Removal of the existing shingle and metal roofing on steep slope areas; single-ply membrane, gravel surfaced built-up roofing; insulation, pre-existing built-up roof all roofing membrane components and discard.
 - 2. Roof replacement:
 - a. Low-slope roof areas to receive new two-ply modified bitumen roofing system.
 - b. Steep-slop roof areas to receive new architectural roof shingles.
 - 3. Miscellaneous work includes, but is not limited to, the installation of edge metal, coping, gutters, downspouts, and flashing.
 - 4. All associated and miscellaneous work as specified.

1.4 GENERAL DESCRIPTION OF EXISTING ROOFING SYSTEMS

- A. Information is provided only to establish general description and is not necessarily accurate. The Contractor is responsible for visiting the site and becoming satisfied as to the existing conditions before preparation and submission of Proposal. Submission of Proposal will be considered evidence Contractor has inspected project areas or otherwise become satisfied on all details relating to the work.
- B. The approximate roof area square footage and top of eave heights above grade are as follows:

| School | Roof Area | Eave/Parapet Height | Size of Roof (sq. ft.) | Structural Slope |
|---------------------------|------------------|---------------------|------------------------|---|
| Vass Lakeview Elementary | Low-slope Roof | approx. 8'-12' | 1,015 | minimal |
| | Steep-slope Roof | approx. 9'-20' | 9,600 | 3 feet 6 inches per foot (mansard) 3 inches per foot |
| Sandhills Farm Elementary | Low-slope Roof | approx. 12'-20' | 2,750 | 1/2 inch per foot minimal |
| | Steep-slope Roof | approx. 20' | 8,320 | |

C. Existing Systems:

1. At Low-Slope roofs of Vass Lakeview Elementary school, the existing roof system generally consists of an aggregate surfaced asphalt and fiberglass felt built-up roof over a tongue and groove wood plank deck. Tapered insulation exists at an isolated area on the lower roof and thickness ranges from 1/4 inch to 3 inches at the high wall.
2. At Low Slope-Roof Areas at Sandhills Farm Elementary school, the existing roofing system generally consists of an aggregate surfaced asphalt and fiberglass felt built-up roof over a tongue and groove plank deck.
3. Flashings, gutters and downspouts are pre-finished steel.
4. Drainage is to gutters and downspouts on all areas except one lower roof of Vass Lakeview Elementary drains to interior roof drains.
5. At steep-slope areas, existing roofing is shingles and standing seam metal roof panels.

1.5 SCHEDULE OF VALUES

A. Roofing Schedule of Values shall include labor and material line items for all material components with a material value of more than \$2,000.00 or 5% of the roofing portion of the contract amount (whichever is least). The schedule of values must include, as a minimum, line items for any of the following which is applicable to this project including separate labor and material line items where applicable.

1. Performance and Payment Bonds.
2. Demolition.
3. Wood Blocking.
4. Insulation.
5. Roofing Membrane System.
6. Shingle Roofing.
7. Base Flashings.
8. Metal Flashings.
9. Gutters/Downspouts.
10. Site Cleanup.
11. Manufacturer's Inspections.
12. Warranties.
13. Unit Prices (individually).

1.6 SUBMITTAL REQUIREMENTS

A. General:

1. All submittals shall be submitted within ten (10) days after the date of the Notice to Proceed.
2. Include Materials List containing the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain Engineer's approval prior to placing orders.
3. Furnish Manufacturer's Certificates of Compliance with materials' specifications, for materials incorporated into the work, signed by a responsible officer of the manufacturing firm and notarized.
4. Prior to the start of any work, submit a copy of AIA Document G703 listing each phase of the work and its scheduled value.
5. Prior to the start of any work, submit copies of Material Safety Data Sheets (MSDS) for all materials to be used in conjunction with this project.
6. Prior to start of any work, submit a schedule of work (broken down by services; reroofing, built-in gutter, and flashing repairs, alternate work (if applicable), etc.
7. Prior to start of any work, submit written safety procedures to include, but not limited to, spill containment, fall protection, etc.

B. Shop Drawings And Submittals:

1. Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data prepared by Contractor or any Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor which illustrate some portion of the work. Samples are physical examples furnished by Contractor to illustrate materials, equipment or workmanship and establish standards for the work.
2. Within ten (10) days after the date of the Notice to Proceed, provide a schedule of the dates for submission of each shop drawing and sample required by the Contract. The sequence of submittals shall permit an orderly review with reasonable time allowed for checking, correction and rechecking corrections, as well as returning the approved or rejected shop drawings and samples to Contractor and, in turn, to any Subcontractor.
3. The aforementioned schedule shall provide at least 10 working days from the date Engineer receives a submittal until the date the submittal is required to be returned to the Contractor. If a submittal contains more than 10 shop drawings, Contractor shall indicate which drawings must be returned within the period of 10 working days, and, in such event, Engineer shall have an additional 10 working days to return the balance of the submittal.
4. Contractor shall be responsible for coordinating the schedule for submittal of shop drawings and samples with the Contractor's progress schedule and the requirements of the Contract. Failure of Contractor to schedule and submit shop drawings and samples in ample time for checking, correction and rechecking will not justify any delay in the timely performance of the work. All shop drawings and samples shall bear the following information and shall be submitted by transmittal form:
 - a. Owner's and Engineer's respective project numbers.
 - b. Date of submittal.
 - c. Submittal Number.
 - d. Title of Project.
 - e. Name of Contractor and date of Contractor's approval.
 - f. Name of Subcontractor or supplier and date of submittal to contractor.
 - g. Reference to Specification Section and Paragraph and/or Drawing Number(s).
 - h. The specific location of that portion of the work covered by the submission.
 - i. Any qualification, departure, or deviation from the Contract requirements.
 - j. Any additional information required by the Specifications for the material being furnished.
5. Each shop drawing shall be numbered. The same numbering system shall be retained throughout all revisions. Each drawing shall have a clear space for the approval stamps of Contractor, Engineer and Engineer's Consultants if any.
6. In submitting shop drawings for approval, all associated shop drawings relating to a complete assembly shall, where possible, be submitted at the same time so that each may be checked in relation to the entire proposed assembly.
7. Contractor shall prepare composite shop drawings and installation layouts, when required, to depict proposed solutions for tight field conditions. The composite shop drawings and field installation layouts shall be coordinated in the field by Contractor and its Subcontractors for the proper relationship to the work of all other trades involved in the work.
8. Prior to submission, Contractor shall review, affix an impressed stamp on, and indicate approval of all shop drawings and samples. Contractor shall determine and verify field measurements and availability of the material and shall have coordinated each shop drawing and sample with requirements of the Contract.
9. With respect to standard manufactured items, Contractor shall submit manufacturer's illustrated cuts of the items to be furnished showing details, sizes and dimensions, and all other pertinent information. Sufficient copies of cuts shall be furnished so that

Engineer may retain a minimum of one (1) hard copy and an electronic copy and return to Contractor the number of copies required for Contractor's use and distribution. Simultaneously, Contractor shall submit one copy of the same documents to Owner, using copies of the submittal transmittal.

10. Engineer will review Shop Drawings and Samples to determine conformance with the design concept of the Project and with the information given in the Contract. Engineer's approval of a separate item shall not be construed to mean approval of the assembly of which such item is a part.
 11. Engineer's approval of Shop Drawings or Samples shall not relieve Contractor of responsibility for any deviation from the requirements of the Contract unless Contractor has informed Engineer in writing of such deviation at the time of submission and Engineer has given written approval to the specific deviation, nor shall Engineer's approval relieve Contractor from responsibility for errors or omissions in the shop drawings or samples.
 12. Contractor shall make any corrections required by Engineer and shall resubmit corrected copies of shop drawings or new samples until approved. Contractor shall direct specific attention in writing, or on resubmitted shop drawings, to revisions other than the corrections required by Engineer. The number and distribution of copies shall be the same as in Contractor's first submission.
 13. In the event that Engineer shall mark shop drawings "approved" or "approved as noted", Contractor shall make such corrections, if any, as may be noted. Correction shall be made on, and prints for final distribution shall be made from, the transparencies bearing Engineer's notations and impress stamps. Final distribution of prints shall be made by Contractor.
 14. No portion of the Work requiring a shop drawing or sample submission shall be commenced until the submission has been approved by Engineer. All such portions of the work shall be in accordance with approved shop drawings and samples.
 15. Any work which will result in structural changes in walls, steel, floors and masonry shall not be commenced by Contractor prior to Engineer's written approval. Contractor's submission for such work shall fully describe all details of methods, shoring and bracing.
- C. Project Submittals include, but are not limited to, the following:
1. Materials List
 2. Materials Certificate of Compliance
 - a. Roofing Membrane System
 - b. Shingle Roofing
 - c. Polyisocyanurate Insulation
 - d. Base Flashing
 - e. Adhesives
 - f. Primers
 - g. Lumber
 - h. Self-Adhering Underlayment
 - i. Sealant
 - j. Plywood
 - k. Cant Strip
 - l. Tapered Edge Strip
 - m. Solder
 - n. Stainless Steel
 - o. Galvalume
 - p. Liquid Flashing
 - q. Liquid PMMA Flashing

3. Manufacturer's Application Procedures
 - a. Roofing Membrane System
 - b. Metal Roof Coating
4. Copies of Authorizations and Licenses from Authorities having jurisdiction
5. AIA Document G703, Schedule of Values
6. Material Safety Data Sheets
7. Schedule for Removal and Installation
8. Written Safety Procedures
9. Underwriter's Laboratories Inc. Class A Roof Covering Certificate from Roofing System Manufacturer
10. Shop Drawings
11. Tapered/Cricket Layout
12. Metal Samples
13. Color Chart
14. Documentation of Existing Conditions
15. List of Subcontractors
16. List of Contractor Staff Assignments and Qualifications
17. Certification from Manufacturer that contractor is approved installer of:
 - a. Roofing Membrane System
 - b. Architectural Roof Shingles

1.7 QUALITY REQUIREMENTS

- A. Installer Qualifications:
1. Installer must be licensed General Contractors for a minimum of five (5) years required by North Carolina Statutes for executing the work being bid. Bidder's name, address, State license number, and date of license must appear on the outside of envelope containing Bidder's proposal.
 2. Installer shall be a licensed Contractor with at least five (5) years of contracting experience in the type of work involved and shall have performed work similar in scope to the work proposed in this project. Evidence of qualifications shall be available upon request by Owner. The contracting firm's experience will be considered in the enforcement of this provision. All experience must have been acquired by the bidding contractor named on the form of proposal. Firms using aliases, or who have changed names during the five (5) year period are subject to disqualification at the discretion of the Owner. Contractor shall demonstrate experience on a minimum of five (5) projects of similar size, scope and complexity to this project.
 3. None but skilled foremen and workmen shall be employed on work requiring special qualifications. Any person employed on the work who fails, refuses, or neglects to obey the instructions in anything relating to this work, or who appears to be disorderly, insubordinate, unfaithful, or incompetent, shall upon the order of the Owner be at once discharged and not again employed on any part of the work. Any interference with, or abusive or threatening conduct toward the Owner or his assistants by the Contractor or his employees or agents, shall be authority for the Owner to annul the Contract and re-let the work.
 4. Bidder shall submit certification from the roofing manufacturer that the bidding contractor is acceptable to the manufacturer as an installer of the manufacturer's system in all regards and no warranties required by the contract documents will be withheld by the manufacturer solely as a result of the bidder's qualifications to perform the work.

B. Superintendent:

1. For the purpose of these Specifications the designation “superintendent” is hereby defined as the individual present on the job site at all times work is being performed.
2. The superintendent shall not be changed except with the consent of the Owner and Engineer, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employment.
3. The superintendent shall be in attendance at the project site at all times during the progress of the work and his duties as superintendent shall be limited to this project only. The superintendent shall supervise and instruct workmen. Should the superintendent be absent temporarily from the project at any time, he shall designate a competent foreman to assume his duties.
4. The superintendent shall have had a minimum of five (5) years continuous experience as a job superintendent.
5. Only the project superintendent (or the designated foreman in the superintendent’s absence) will be permitted inside the facility, except when accompanied by the superintendent to perform work or in cases of emergency.
6. The Contractor shall provide the Owner, in writing, the name of the proposed project manager, job superintendent and foreman for approval no later than seven (7) days prior to the prework conference. Also include chronological listing of superintendent’s experience by project name, type system, size and required warranty.
7. Once approved, neither the project manager nor the superintendent will be changed except with the consent of the Owner unless either proves to be unsatisfactory to the Owner or Contractor or ceases to be in the Contractor’s employment.
8. Promotion or reorganization within the company will not be an acceptable cause for reassignment of project manager or superintendent.
9. It shall be the superintendent’s responsibility to communicate all matters pertaining to the Work with the Owner and/or Engineer. In case of emergency or safety, superintendent shall communicate directly with the Owner or Owner’s representative, and, immediately thereafter, notify the Owner and/or Engineer. No decisions regarding changes in the Work will be made without the Owner’s knowledge.
10. The job superintendent will have a local contact phone number.

C. Workmanship:

1. None but skilled foremen and workmen shall be employed on work requiring special qualifications. Any person employed on the work who fails, refuses, or neglects to obey the instruction in anything relating to this work, or who appears to be disorderly, insubordinate, unfaithful, or incompetent, shall upon the order of the Owner be at once discharged and again employed on any part of the work. Any interference with, or abusive or threatening conduct towards the Engineer or his assistants by the Contractor or his employees or agents, shall be authority for the Owner to annul the Contract and re-let the work.

D. Inspection Of Work:

1. Work found to be in violation of specifications or not in accordance with established workmanship practices and standards will be subject to complete removal and proper replacement with new materials at Contractor’s expense.
2. The words “supervise” and “inspect” wherever used herein in connection with the duties or activity of the Owner shall in no way, expressed or implied, relieve the contractor from his responsibilities for the safety of the workmen, the preservation of the work or proper performance under this contract. The Owner shall not be responsible for the safety of the workmen, the safeguarding of the work, or the proper performance of the Contractor.
3. No Inspector shall have the power to waive the obligations resting upon the Contractor to furnish good material and do good work as herein prescribed. Any

- failure or omission on the part of any Inspector or the Engineer to observe, object to or condemn any defective material or work shall not release the Contractor from the obligation to at once tear out, remove, and properly replace or rebuild the same at any time upon discovery of the defect and upon notice from the Owner or Engineer to do so.
4. Materials stored on site which are marked by the Inspector, Engineer or Owner as not meeting the requirements of the contract documents are to be removed from the site by the contractor immediately.
 5. Failure of Owner or Engineer to discover or reject defective work, or work not in accordance with the Contract, shall not be deemed an acceptance thereof, nor a waiver of Owner's rights to Contractor's compliance with the Contract or performance of the work, or any part thereof. No partial or final payment, or partial or entire occupancy, by Owner shall be deemed to be an acceptance of work or of material which is not strictly in accordance with the Contract, nor shall it be deemed to be a waiver by Owner of any of Owner's rights pursuant to this Contract or otherwise.
 6. Substantial Completion Inspection shall be conducted as follows:
 - a. When Engineer has certified substantial completion, Contractor shall have an additional thirty (30) calendar days to complete all work under the contract, including any outstanding punch list items established at the substantial completion; any required submittals, including warranties, release of liens, unit price logs, consents of surety, final pay request, etc.
 - b. Substantial completion is defined for this project as the successful installation of every component required under the contract documents to be installed for this project. A punch list may be issued by the Engineer for work complete at this time.
 7. Final Inspection shall be conducted as follows:
 - a. The Engineer and Owner will conduct a final inspection of all work included in the contract as soon as possible after receiving written notification by the Contractor that the work is complete and ready for inspection.
 - b. The final inspection report shall be prepared by the Engineer and Owner listing observed deficiencies and furnished to the Contractor.
 - c. Engineer, with Owner approval, shall prepare and execute in triplicate a Certificate of Substantial Completion, AIA Document G704, and forward to the Contractor for processing after final payment.
 - d. Upon satisfactory completion of all deficiencies, Contractor shall initial each item on the report certifying his compliance and return to the Engineer.
 - e. No portion of the final payment will be made until all items have been satisfactorily corrected and the project closeout documents submitted to the Architect/Engineer.
 - f. All project completion documents are to be submitted within thirty (30) days following acceptance by the Owner.
- E. Manufacturer's Inspections:
1. A representative for the roofing manufacturer shall conduct periodic inspections throughout the course of the work. The representative shall prepare a written report for each inspection and shall promptly provide a copy of each report to the Owner, Contractor and Engineer. Each report shall note any deficiencies the representative observes which require correction. A minimum of three (3) inspections is required for this project including a final inspection after contractor has completed installation of all roof system components.
- F. Pull Tests:
1. Prior to proceeding with the application of new roofing over a nailable deck, conduct random pull tests of specified fastener using equipment calibrated to provide accurate

withdrawal resistance loads. Test fasteners in each area of deck comprising a day's work or every 3,000 square feet, whichever is least. Test fasteners by installing into deck and test to failure or until fastener has achieved the minimum average resistance required. Test a minimum of five (5) fasteners in each area. Additionally, Engineer or Owner may require additional testing based upon results of initial testing or any questionable appearance of the deck. Test all areas of the deck which differ significantly in appearance. Notify Engineer in the event average withdrawal resistance of fasteners tested is less than the minimum specified. Submit results of testing to Engineer within 48 hours of testing.

2. Average minimum withdrawal resistance:
 - a. Wood Deck: 100 lbs.

1.8 SCAFFOLDING AND PLATFORMS

- A. Contractor shall provide all necessary platforms and scaffolds of ample strength. Inclusive are all hoisting machinery, all appliances and materials such as ladders, planks, ropes, wedges, centers and other tools and materials including the carriage thereof to and from the buildings as required for proper handling and installation and/or erection of materials and equipment included in the work.
- B. Prior to starting work Contractor shall obtain approval of the Owner for locations of work operations at ground level such as material storage, hoisting, dumping, etc. Work will be restricted to approved locations.

1.9 TEMPORARY PROTECTION

- A. Temporary measures shall be provided and maintained by the Contractor to protect the building and its contents from weather and construction related damages. Damaged or disturbed buildings or grounds to be corrected to the Owner's satisfaction prior to final payment.
- B. Protect the existing building, roof, equipment, and grounds from flying or falling debris during the demolition process. Protect protection so as not to disrupt building operations or cause damage to the building and its contents during construction.

1.10 PROTECTION OF BUILDINGS AND PROPERTY

- A. Note that building will remain occupied during work. Take all precautions necessary to protect building, contents and personnel from damage or injury from operations and from water entry into the building during construction. Keep dust and dirt to a minimum.
- B. At conclusion of each day's work, carefully inspect all sealant joints to ensure system is completely water-tight, all stored materials are suitably protected from the weather and all equipment is stored in such a manner as not to interfere with facility operations.
- C. On normal workdays when no work is accomplished due to inclement weather or other reasons, visit the site no later than normal start time and verify that the system is completely water-tight, all stored materials are suitably protected from the weather and all equipment is stored in such a manner as not to interfere with facility operations. Be prepared to implement emergency repairs as necessary to prevent leakage into the facility.
- D. Prior to starting work, obtain approval from Owner for locations of work operations at ground level, such as material storage, hoisting, dumping, etc. Restrict work to approved locations.
- E. Prevent any work which could reasonable be deemed to be hazardous from taking place over or adjacent to occupied areas. Coordinate with the Owner the vacating of such affected areas of all occupants and give the Owner adequate notice to allow time to comply.

- Contractor shall secure area below swing stage areas during all work taking place overhead. When working over exterior doors, Contractor shall provide adequate protection to safeguard people below.
- F. Contractor shall add any safety measures, including nets and tethering, to prevent materials or equipment from falling from swing stages or other means of access.
 - G. Contractor shall protect adjacent existing and new roof areas from damage. Loosely lay 1.5 - inch (minimum) extruded polystyrene (XPS) or 1.5-inch (minimum) polyisocyanurate, over the roof surface. Loosely lay .75-inch (nominal) plywood or OSB over the XPS/polyisocyanurate. XPS/polyisocyanurate must extend a minimum of 1-inch past the edges of the plywood/OSB. If the XPS/polyisocyanurate gets crushed during construction, replace in kind. This protection is to be used on all areas that will be used for construction (storage/laydown, foot traffic, etc.) and will be in place prior to any construction activities. Ensure the system is connected laterally to prevent any material from shifting and/or becoming airborne. In the event roofing is damaged, Contractor is to restore to the original condition at no cost to the Owner. Final acceptance of repaired roof membrane will be granted by USC and Engineer.
 - H. Remove debris and other material from the site in a timely manner to minimize accumulation.
 - I. Owner reserves the right to judge whether or not debris is being removed in a timely manner. In the event debris is not removed from the site as required to maintain the site in a manner acceptable to the Owner, the Owner reserves the right to engage other contractor(s) or its own forces to clean the areas and deduct costs of such operations from this Contract.
 - J. Protect grounds and landscaping from damage. In the event of damage, restore damaged property to a condition equivalent to that at time of start of operations.
 - K. Document all existing damage to facility prior to beginning work and produce documentation acceptable to Engineer/Owner prior to starting work. Damage discovered during the project which was not documented, and which is not clearly the responsibility of others may be presumed by the Engineer/Owner as the responsibility of the Contractor. Documentation may be in the form of written statements and/or drawings but must also be supported with photographs and/or video supplied by the Contractor.
 - L. Isolate equipment from non-Contractor personnel by whatever means necessary, including the construction of a six-foot tall chain link fence (which completely surrounds the equipment, bitumen storage and personnel necessary to maintain the equipment) with integral lockable gate. Owner reserves the right to judge adequacy of Contractor's methods to isolate equipment and may, at any time, demand construction of the fence as compliance with this requirement. Should the Owner demand the construction of the fence, such shall be accomplished at no additional cost to the Owner.
 - M. Implement related safety provisions imposed by local fire marshals, etc. Determine what procedures will be acceptable prior to submitting a bid or proposal.
 - N. Initiate, maintain and supervise all safety precautions and programs in connection with the work. Take all necessary precautions for the safety of, and provide the necessary precaution to prevent damage, injury or loss to:
 - 1. All employees on the work and other persons who may be affected thereby.
 - 2. All the work and all materials or equipment to be incorporated therein, whether in storage on or off the site.
 - 3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

4. Comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. Remedy all damage, injury or loss to any property caused, directly or indirectly in whole or in part, by the Contractor, and Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.
- O. Contractor will install overhead protection at all entrances and sidewalks to protect pedestrians from overhead debris.

1.11 DISCONNECTS

- A. In the event it is necessary to disconnect any electrical wiring or connections, plumbing lines or other building services, notify the Owner. Do not disconnect or connect services unless authorized in writing by Owner.
- B. Include in the Base Proposal all costs required for modification of existing service piping, wiring and duct work required in connection with the lifting, removal or relocation of roof-mounted equipment.
- C. All associated work is to be accomplished by appropriately licensed personnel in accordance with all applicable codes and regulations.
- D. Review roof-top equipment usage with Owner and facility user at beginning of project. If necessary, disable equipment determined to be essential to the operations of the facility only at those times prescribed by the Owner. This may require work to be done at other than normal operating hours.

1.12 SELECTIVE DEMOLITION

- A. Removals:
 1. Carefully relocate all electrical, co-axial, telephone, fiber optic, intercom and miscellaneous wires, cables, etc. as required to accomplish work specified herein. Accomplish such relocation without interrupting the service provided by these lines except as specifically authorized by the Owner. Become familiar with each line and the level of precaution necessary to relocate them or work around them. Upon completion of roofing work, relocate lines to their original positions and secure them as originally secured unless indicated otherwise in these specifications or on the project drawings.
 2. Remove or correct any obstruction which might interfere with the proper application of new materials.
 3. Remove all existing roofing, pre-existing built-up roof, roofing insulation, membrane, flashing and metal flashings down to existing deck and discard. Contractor shall take reasonable precautions as necessary to avoid damaging deck during removals, like backing out screws, etc. Deck damage as the result of removals will be repaired by the Contractor at no cost to Owner.
 4. Remove or correct any obstruction which might interfere with the proper application of new materials.
 5. Contractor is to provide means and methods as necessary to protect adjacent surfaces from damage. Components damaged will be repaired by the contractor at no cost to the owner.
 6. Remove all existing abandoned HVAC, duct, ventilators, covered curbs, skylights, sanitary vents, pipe penetrations, and all roof mounted equipment and associated curbs and discard. Refer to Section "Roofing Preparation" for covering openings in the deck.

7. Remove existing counterflashing, and edge metal and discard.
8. Remove existing gutters and downspouts and discard.
9. Remove abandoned roof drain and discard.
10. Remove existing wood fascia and replace with new wood fascia.

1.13 ASBESTOS PRODUCTS

- A. It is the intention of these Specifications that no asbestos-containing materials be incorporated into the work and that, unless specifically designated to remain, no existing asbestos-containing materials incorporated in the existing roof system will remain subsequent to completion of the work. In the event additional hidden or unanticipated asbestos-containing materials are present in the existing roof system, stop all work in the affected area, notify the Engineer and provide temporary protection as required. Costs incurred, if any, due to the presence of hidden and/or unanticipated asbestos-containing materials will be resolved by Change Order to this Contract.
- B. Warranty: Upon completion of the work, and before final payment and/or release of retainage, submit, and obtain from each subcontractor, material supplier and equipment manufacturer and submit, a properly executed Asbestos Free Warranty. Provide Warranty in the form included hereafter. Ensure forms are signed by a responsible officer of the Contractor, subcontractor, material supplier and equipment manufacturer and are notarized.

ASBESTOS FREE WARRANTY
(on Contractor's standard letterhead)

Owner: Moore County Schools

Location of Building: _____

Name of Building/Project: _____

Know all men by these presents that we, _____
(Contractor, Subcontractor, Material Supplier or Equipment Manufacturer)

having furnished labor, materials, equipment and/or supplies; removed roofing, roof insulation, flashings and/or miscellaneous roof system components; installed new roofing, roof insulation, flashing and/or miscellaneous roof system components;

from, to and/or on _____ as shown on the roof plan below under
(Buildings, Roof Areas, etc.)

contract between _____ and _____
(Owner and Contractor) *(Contractor and/or Subcontractor, Material Supplier or Equipment Supplier)*

warrant to Owner with respect to said work that no materials containing asbestos fibers were incorporated into the work, and that, to our knowledge and belief, no materials containing asbestos remain in or are covered by the work.

Exceptions: _____
If there are no exceptions, state "No Exceptions" here

IN WITNESS WHEREOF, we have caused this instrument to be duly executed, this _____ day of _____, 20 _____.

WITNESS:

Company

By

Notary Public

END OF SECTION

SECTION 07 50 00.20
ROOFING - UNIT MASONRY REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Repairing masonry, including replacing units.
 - 2. Repointing masonry mortar joints.
 - 3. Through-Wall Flashings.
 - 4. Weeps

1.3 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Section 01 22 00 - Unit Prices.
 - 1. Unit prices apply to authorized work covered by estimated quantities.
 - 2. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.4 DEFINITIONS

- A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
- B. Saturation Coefficient: Ratio of the weight of water absorbed during immersion in cold water to weight absorbed during immersion in boiling water; used as an indication of resistance of masonry units to freezing and thawing.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to masonry repair including, but not limited to, the following:
 - a. Verify masonry repair specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Materials, material application, sequencing, tolerances, and required clearances.
 - c. Quality-control program.
 - d. Coordination with building occupants.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include recommendations for product application and use. Include test data substantiating that products comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and locations of replacement masonry units on the structure, showing relation of existing and new or relocated units.
2. Show provisions for expansion joints or other sealant joints.
3. Show provisions for flashing, lighting fixtures, conduits, and weep holes as required.
4. Show locations of scaffolding and points of scaffolding in contact with masonry. Include details of each point of contact or anchorage.

C. Samples for Initial Selection: For the following:

1. Colored Mortar: Submit sets of mortar that will be left exposed in the form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or plastic channels.
 - a. Have each set contain a close color range of at least three Samples of different mixes of colored sands and cements that produce a mortar matching existing, cleaned mortar when cured and dry.
 - b. Submit with precise measurements on ingredients, proportions, gradations, and source of colored sands from which each Sample was made.
2. Sand Types Used for Mortar: Minimum 8 oz. of each in plastic screw-top jars.
3. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For the following:

1. Each type of masonry unit to be used for replacing existing units. Include sets of Samples to show the full range of shape, color, and texture to be expected. For each masonry type, provide straps or panels containing at least four units. Include multiple straps for masonry with a wide range.
2. Each type of patching compound in the form of briquettes, at least 3 inches long by 1-1/2 inches wide. Document each Sample with manufacturer and stock number or other information necessary to order additional material.
3. Accessories: Each type of accessory and miscellaneous support.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For masonry repair specialist, including field supervisors and workers.

B. Quality-Control Program.

1.8 QUALITY ASSURANCE

- A. Masonry Repair Specialist Qualifications: Engage an experienced masonry repair firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing masonry is insufficient experience for masonry repair work.
 - 1. Field Supervision: Masonry repair specialist firm shall maintain experienced full-time supervisors on Project site during times that masonry repair work is in progress.
- B. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage.
- C. Mockups: Prepare mockups of masonry repair to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation.
 - 1. Masonry Repair: Prepare sample areas for each type of masonry repair work performed. If not otherwise indicated, size each mockup not smaller than two adjacent whole units or approximately 48 inches in least dimension. Construct sample areas in locations in existing walls where directed by Engineer or Owner unless otherwise indicated. Demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 WARRANTIES

- A. Materials List: Give written notifications of the brand name and manufacturer of each material purposed for use and include a statement that all purposed materials meet the specifications requirements.
- B. Installers Warranty: Installers Warranty, on form at the end of this section, shall be signed by penetrating masonry sealer installer, properly executed and printed on installer's standard letterhead form.
 - 1. Warranty Period: Five (5) years from date of substantial completion.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry units to Project site strapped together in suitable packs or pallets or in heavy-duty cartons and protected against impact and chipping.
- B. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

- D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
- E. Store sand where grading and other required characteristics can be maintained and contamination avoided.
- F. Handle masonry units to prevent overstressing, chipping, defacement, and other damage.

1.11 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry repair work to be performed according to product manufacturers' written instructions and specified requirements.
- B. Temperature Limits, General: Repair masonry units only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain each type of material for repairing masonry (masonry unit, cement, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 MASONRY MATERIALS

- A. Face Brick: ASTM C 62, as required to complete brick masonry repair work.
 - 1. Brick matching Owner's Sample: Units with colors, color variation within units, surface texture that match Owner's sample. Match existing units in size and shape.
 - a. For Owner's sample that exhibits a range of colors or color variation within units, provide brick that proportionally matches that range rather than brick that matches an individual color within that range.

- B. Building Brick: ASTM C 62, of same vertical dimension as face brick, for masonry work concealed from view.
 - 1. Grade SW where in contact with earth.
 - 2. Grade SW, MW, or NW for concealed backup.

2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or Type II, except Type III may be used for cold-weather construction; white or gray, or both where required for color matching of mortar.
 - 1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Masonry Cement: ASTM C 91/C 91M.
 - 1. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. [Cemex S.A.B. de C.V.](#); Brikset Type N Citadel Type S Dixie Type S Kosmortar Type N Richcolor Type N Richmortar Type M.
 - b. [Essroc Italcementi Group](#); Brick-Lok Brixment or Velvet.
 - c. [Holcim \(US\) Inc.](#); Rainbow Mortamix Custom Buff Cement Rainbow Mortamix Custom Color Masonry Cement Rainbow Mortamix Masonry Cement Rainbow Mortamix White Cement.
 - d. [Lafarge North America Inc.](#); Lafarge Masonry Cement Magnolia Buff, Dark & Ultra Dark Masonry Cement Magnolia Mason's Mix Masonry Cement Trinity White Masonry Cement.
 - e. [Lehigh Hanson, Inc.](#); Lehigh Masonry Cement Lehigh White Masonry Cement.
 - f. [Quikrete Companies, Inc. \(The\)](#); Quikrete Masonry Cement.
- D. Mortar Cement: ASTM C 1329/C 1329M.
 - 1. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. [Lafarge North America Inc.](#); Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.
 - b. Or equal.
- E. Mortar Sand: ASTM C 144.
 - 1. Exposed Mortar: Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
 - 2. Colored Mortar: Natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
- F. Mortar Pigments: ASTM C 979/C 979M, compounded for use in mortar mixes, and having a record of satisfactory performance in masonry mortars.

1. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. [Davis Colors, Inc.](#); True Tone Mortar Colors.
 - b. [Lanxess Corporation](#); Bayferrox Iron Oxide Pigments.
 - c. [Solomon Colors, Inc.](#); SGS Mortar Colors.

G. Water: Potable.

H. Weep/Vent Products: Free draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer width; in color selected from manufacturers standard; Mortar Net Weep Vents or approved equal.

I. Wall Ties: Meeting ACI 530-1/ASCE 6/TME 602. Provide minimum 2 inch embedment into mortar. POS-I-Tie® Triangle Wire Tie as manufactured by Heckman Building Products, Inc. or approved equal.

1. Wire 3/16 inch diameter.
2. Hot dipped galvanized.

2.4 ACCESSORY MATERIALS

A. Setting Buttons and Shims: Resilient plastic, non-staining to masonry, sized to suit joint thicknesses and bed depths of masonry units, less the required depth of pointing materials unless removed before pointing.

B. Masking Tape: Non-staining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.

C. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Minimal possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could leave residue on surfaces.

D. Through-wall Flashing Accessories for Unified System: End dams, outside/inside corners, safety, etc.

2.5 THROUGH-WALL FLASHING MEMBRANE

A. 40 mil thick, non-asphalt composite membrane with a proprietary clear adhesive factory laminated to polyethylene sheeting, meeting:

1. ASTM D412C, 6242 psi
2. ASTM D412C, 16% elongation
3. ASTM E154, 331.8 lbs. puncture resistance
4. ASTM D570, .77% water absorption
5. ASTM D903, 1506 N/m peel strength

6. ASTM E96, .0152 perms Moisture Vapor Permeation

2.6 MORTAR MIXES

- A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
- B. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Engineer's approval.
 - 1. Mortar Pigments: Where mortar pigments are indicated, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black which is limited to 2 percent, unless otherwise demonstrated by a satisfactory history of performance.
- C. Do not use admixtures in mortar unless otherwise indicated.
- D. Mixes: Mix mortar materials in the following proportions:
 - 1. Rebuilding (Setting) Mortar by Property: ASTM C 270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to Portland cement and lime.
 - 2. Pigmented, Colored Mortar: Add mortar pigments to produce exposed, setting (rebuilding) mortar of colors required.
- E. Mixes: Mix mortar materials in the following proportions:
 - 1. Pointing Mortar: Mortar shall be Type N.
 - 2. Pointing Mortar by Volume: ASTM C 270, Proportion Specification, Type N unless otherwise indicated, with cementitious material limited to Portland cement and lime. Add mortar to pigments to produce mortar colors required.
 - 3. Mortar Mix: To be mixed in accordance with the pre-construction testing, Brick Masonry Repointing, Section 1.11.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Prevent mortar from staining face of surrounding masonry and other surfaces.
 - 1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
 - 2. Keep wall area wet below rebuilding and repair work to discourage mortar from adhering.
 - 3. Immediately remove mortar splatters in contact with exposed masonry and other surfaces.
- B. Provide temporary rain drainage during work to direct water away from building.

3.2 MASONRY UNIT REMOVAL AND REPLACEMENT

- A. Remove masonry units that are damaged, spalled, or deteriorated. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.
 - 1. When removing damaged single masonry units, remove material from center of masonry unit and work toward outside edges.
- B. Support and protect remaining masonry that surrounds removal area.
- C. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition
- D. Notify Engineer of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.
- E. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for masonry replacement.
- F. Install replacement masonry unit into bonding and coursing pattern of existing masonry. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
 - 1. Maintain joint width for replacement units to match existing joints.
 - 2. Use setting buttons or shims to set units accurately spaced with uniform joints.
- G. Lay replacement masonry with rebuilding (setting) mortar and with completely filled bed, head, and collar joints. Butter ends with enough mortar to fill head joints and shove into place. Wet both replacement and surrounding masonry that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.
 - 1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing masonry work.
 - 2. Rake out mortar used for laying masonry before mortar sets according to specifications. Point at same time as repointing of surrounding area.
 - 3. When mortar is hard enough to support units, remove shims and other devices interfering with pointing of joints.
- H. Curing: Cure mortar by periodically spraying a fine mist to repointed area and adjacent masonry.
 - 1. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

3.3 THROUGH-WALL FLASHING INSTALLATION

- A. Furnish and install new through-wall flashings at masonry walls as specified herein. Refer to Drawings.
- B. Repair exterior insulation with new insulation to match existing, as needed.
- C. Masonry:

1. Contractor is to provide any and all means necessary to protect and flashings from puncture or any other damage. Contractor will be responsible for all damage caused by this project at no additional expense to the owner.
 2. Begin removing masonry in 4' long sections. Alternate 4' long work sections so that at no time are any two sections closer than 3' apart. Do not remove masonry in one section around corners.
 3. Remove a minimum of three (3) courses of brick in each work section. Additional courses of brick may require removal depending on location of block wall joints behind cavity. Contractor shall provide shoring of brick masonry as necessary at open sections.
- D. All brick work for this project shall be performed by a qualified mason and under the supervision of a licensed general contractor.
- E. Prior to installation of through-wall flashing, install new metal drip edge as specified in Section 07 50 00.70 - Roofing - Sheet Metal Flashing and Trim and through-wall accessories such as end dams, inside/outside corners, etc.
1. Prime all metal surfaces.
- F. Provide end dams at flashing terminations at walls for control of drainage.
- G. Ensure that the flashing is installed so as to provide positive slope to the exterior of the masonry cladding. Do not allow through-wall flashing material to sag below the level of the weeps. Install three (3) rows of sealant at through-wall flashing side laps and lap 6 inches. Install termination bar and seal top of bar with sealant.
- H. Seal between through-wall flashing and drip edge.
- I. At rake walls, install new through-wall flashing at height above roof as required to accommodate new roof flashings with face width of 4 to 8 inches. Step through-wall flashing along rake wall to conform to roof slope.
- J. Furnish and install new masonry units to match existing as specified herein.
- K. Install new cavity drainage material. Provide vented weeps spaced at every other masonry unit head joint.

3.4 FINAL CLEANING

- A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water applied by low-pressure spray.
- B. Clean adjacent non-masonry surfaces. Use detergent and soft brushes or cloths.
- C. Remove masking materials, leaving no residues that could trap dirt.

3.5 FIELD QUALITY CONTROL

- A. Engineer's Project Representatives: Engineer will assign Project representatives to help carry out Engineer's responsibilities at the site, including observing progress and quality of portion of the Work

- completed. Allow Engineer's Project representatives use of lift devices and scaffolding, as needed, to observe progress and quality of portion of the Work completed.
- B. Notify Engineer's Project representatives in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until Engineer's Project representatives have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location.

3.6 MASONRY WASTE DISPOSAL

- A. Masonry Waste: Remove masonry waste and legally dispose of off Owner's property.

END OF SECTION

SECTION 07 50 00.30
ROOFING - ROUGH CARPENTRY

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. Plywood sheathing
- 2. Wood blocking/Fascia
- 3. Wood roof decking

- B. Related Requirements:

- 1. Section 01 21 00 - Allowances.
- 2. Section 01 22 00 - Unit Prices.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings. Materials which are not stored under specified covers are subject to removal from the site at Engineer's or Owner's discretion.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: No. 2 grade (or better) southern yellow pine or Douglas fir unless specifically noted otherwise. Each piece of lumber shall bear the inspection stamp of the Southern Pine Inspection Bureau (SPIB) or the Western Wood Products Association (WWPA) indicating the grade and type of lumber. Retain items required to be made from certified wood if not all rough carpentry must be certified wood; verify that certified wood is available for each item before retaining.

- 1. Wood Preservative: Alkaline Copper Quaternary (ACQ) pressure-treatment conforming to AWWPA Standard C-2 (above ground). Retention of preservative shall be 0.25 pcf. All material shall be kiln-dried after treatment to 19 percent or less moisture content.

- B. Plywood: APA Rated Sheathing (CDX) with waterproof glue for exterior applications in thicknesses specified. All plywood shall comply with the requirements of U.S. Product Standard PS 1-09 and each sheet shall clearly bear the APA trademark of the American Plywood Association. Plywood shall be 3/4-inch-thick to match existing with a span rating of 48/24.

2.2 FASTENERS

- A. Provide stainless steel fasteners at all locations where fastener will come into contact with pressure-treated lumber
- B. For securing lumber or plywood to lumber, provide stainless steel ring shank nails of sufficient length to penetrate a minimum of 1½ inches into the underlying member but not smaller than 8d nails.
- C. For securing wood to concrete or masonry, secure using Tapcon Masonry fasteners and/or drive pins at 6-inches on center, staggered.
- D. For securing wood to steel, secure using self-drilling/self-tapping fasteners.

PART 3 - EXECUTION

3.1 GENERAL

- A. Secure wood nailers over existing nailers with ring shank fasteners or screws in two rows staggered and spaced not over 6-inches in each row.
- B. Stagger fasteners when securing nominal 6-inch-wide lumber or wider.
- C. Secure new wood blocking to parapet wall using specified fasteners at 9-inches on center, staggered.
- D. Secure beveled wood where shown using Tapcon fasteners spaced at 8 inches on center.

3.2 EXISTING WOOD

- A. Inspect all existing wood blocking and fascia carefully. If, in Contractor's opinion, there is existing wood which requires replacement, notify the Engineer. Do not proceed with removals or replacement until directed by the Engineer. Install new wood blocking the same size and thickness as the existing where removed.
- B. Inspect existing wood blocking and fascia. In the event current fastener spacing exceeds 8 inches on center, secure blocking with additional specified fasteners to achieve fastener rate of 8 inches on center or less.

3.3 PLYWOOD SHEATHING AT PARAPET WALLS

- A. Install new 3/4-inch-thick plywood sheathing at parapet walls as specified herein.
- B. Refer to Drawings for locations.

- C. Space plywood a minimum of 1/8 inch at ends.
- D. Secure plywood using specified fasteners, spaced at 9-inches on center along all edges.
- E. Protect installed plywood from damage until system is complete.

3.4 ABANDONNED EQUIPMENT COVERING

- A. At all locations where openings are less than 12" x 12", install 20-gauge steel plate per Section 07 50 00.40 - Roofing Preparation.

END OF SECTION

SECTION 07 50 00.40
ROOFING PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following
 - 1. Preparations.
 - 2. Deck repairs.
- B. Related Sections include the following:
 - 1. Section 01 21 00 - Allowances.
 - 2. Section 01 22 00 - Unit Prices.
 - 3. Section 02 41 19 - Selective Demolition.

PART 2 - PRODUCTS

2.1 WOOD DECK REPAIR MATERIALS

- A. Wood Deck Fasteners: Ring shank common nails, length to penetrate 2-inches into underlying joists.
- B. Sheet Metal for Wood Decks: 20-gauge galvanized steel.

PART 3 - EXECUTION

3.1 PREPARATION, GENERAL

- A. Prior to commencement of any work, inspect and thoroughly water test all existing downspout boots for free flow operation with Owner's maintenance personnel present. Report drainage restrictions to Engineer. Should downspout boots become clogged at any time after the start of work, correct the condition at no additional expense to the Owner.
- B. Prior to the installation of any new roofing, flashings, and metal flashings, clean surfaces of all dust, dirt and other foreign matter.
- C. Over all abandoned openings, install new steel plates (if required). Secure to deck using specified fasteners spaced not over 6 inches on center at all edges.

- D. Larger openings may require reinforcement of the plate to prevent deflection. Determination of need will be made by the Engineer after plate is in place. In such event, type and location of reinforcement will be determined and will be authorized by Owner by a Change Order to this Contract.
- E. Extend all existing vents through the roof to the height required by the local plumbing code but not less than 8 inches above finished roof level.

3.2 DECK REPAIR

- A. Inspect the deck carefully. If there are wood deck areas which require repair or replacement, notify the Engineer and Owner. Do not proceed with repair or replacement until directed by the Owner.

3.3 WOOD DECK REPAIRS

- A. Re-nail any loose or warped wood deck units using specified fasteners spacing nails to ensure securement.
- B. Remove all existing wet, damaged or deteriorated wood deck units and discard. Replace any such discarded material with new material the same size and thickness as existing.
- C. Provide wood deck units long enough to be continuous over a minimum of three roof supports.
- D. Cover all cracks in wood decking $\frac{1}{4}$ -inch or more in width and joists $\frac{1}{2}$ -inch or more in width and all knot holes with sheet metal nailed in place with specified fasteners at 4-inches on center, staggered along all edges of metal.

END OF SECTION

SECTION 07 50 00.50
SHINGLE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Drawings and general provisions of the Contract and Specifications apply to this section. Applicable parts of other technical specifications that require coordination with the work specified in this Section also apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Asphalt Shingle Roofing.
 - 2. Self-adhering Underlayment.
- B. Related Sections include the following:
 - 1. Section 07 50 00.30 - Roofing - Rough Carpentry.
 - 2. Section 07 50 00.40 - Roofing Preparation.
 - 3. Section 07 50 00.70 - Roofing - Sheet Metal Flashing and Trim.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide a roofing system that complies with the requirements of Underwriter's Laboratories, inc. for a Class A and UL 790 roof covering.
- B. Provide roofing system to resist a 90 mph air velocity.

1.4 SUBMITTALS

- A. Give the Owner written notification of the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain Owner's approval prior to placing orders.
 - 1. Submittal of catalog cut sheets, etc. in lieu of the materials list required above is not acceptable.
- B. Manufacturer's Installation Instructions: As follows:
 - 1. Contractor shall submit three (3) copies of the shingle manufacturer's instructions to Engineer/Owner for approval prior to beginning application.
- C. Manufacturer's Certificates: As follows:
 - 1. System Certificates: Signed by shingle manufacturer certifying that shingle system complies with requirements specified in "Performance Requirements" article.

2. Material Certificates: Furnish Manufacturer's Certificates of Compliance with materials' specifications, for materials incorporated into the work, signed by a responsible officer of the manufacturing firm and notarized. Each certificate shall be an original document printed on the manufacturer's standard letterhead. Each certificate shall specifically reference the project and the applicable compliance standard.

D. Warranties: As specified in this Section.

E. Samples for Initial Selection: For each type of asphalt shingle, ridge and hip shingles indicated.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials to site in original containers bearing manufacturers' name and type of material. All materials used in roof membrane must have appropriate Underwriters' Laboratories, Inc. labels.

B. Supply and keep all materials dry at all times prior to application.

C. Store all roll goods on end on clean floors or platforms. Do not use flattened rolls or rolls with ends damaged.

D. Materials which, in the opinion of the Engineer, have been prematurely exposed to the weather are subject to immediate removal by the contractor and replaced with new materials at contractor's expense. Engineer may, at Engineer's option, mark such materials with paint or other indelible materials while they remain on-site.

1.6 WARRANTIES

A. Standard Materials Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of roofing system that fail in materials within specified warranty period. Failure includes roof leaks.

1. Special warranty includes shingles, underlayment, ridge and hip shingles and other components of roofing system.

2. Warranty Period: 50 years from date of Substantial Completion.

3. Wind-Speed Warranty: Asphalt shingles will resist blow-off or damage caused by wind speeds up to 75 mph for 50 years from date of Substantial Completion.

B. Installer's Warranty: Installer's warranty, on form at end of this Section, signed by roofing Installer, properly executed and printed on Installer's letterhead form.

1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

A. Listed in this section are specifications for materials required generally for use in accomplishing the work specified. Materials not listed may also be required.

- B. Except as specifically noted herein, all reference standards included herein are to be presumed to be the latest published editions of such standards available as of the issue date of these specifications.
- C. Brand or manufacturer names are used as standards of quality where no other appropriate reference is available. The Engineer (or Owner) will consider substitution of materials of equal quality and properties provided a written request accompanied by substantiating data is received by him at least 10 days prior to bid date.
- D. Where a generic product or a general manufacturer's product is specified and more than one such product is offered by the manufacturer, it is understood that only the manufacturer's premium materials are approved for this project.
- E. All shingle system components used on this project shall be compatible and approved for use by the shingle manufacturer and shall be covered by the specified shingle guarantee.

2.2 MANUFACTURERS

- A. All materials used in systems to be covered by a Manufacturer's Guarantee must be supplied by the same manufacturer, unless the manufacturer issuing the guarantee waives this requirement in writing.
- B. The following material manufacturers are approved for this project. Such approval does not relieve the contractor from the requirement to supply materials which meet all other requirements of these specifications.
 - 1. Owens-Corning
 - 2. ELK
 - 3. Tamko
- C. Alternate manufacturers shall meet all requirements of these specifications, including warranty, fire rating and length of production.

2.3 SHINGLE MATERIALS

- A. Laminated-Strip Asphalt Shingles: ASTM D 3462, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing, with the following characteristics:
 - 1. Tab Arrangement: Four tab, random cut.
 - 2. Cutout Shape: Saw tooth.
 - 3. Butt Edge: Straight.
 - 4. Strip Size: Manufacturer's standard.
 - 5. Algae Resistance: Granules treated to resist algae discoloration.
 - 6. Color and Blends: As selected by Owner from manufacturer's standard selections.
 - 7. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.
- B. Contractor shall provide color selection charts to owner from at least two approved manufacturers for shingle selection prior to ordering materials. Color selection charts shall be limited to manufacturer's standard colors. In the event, owner chooses a color from non-standard charts, contractor will be allowed a change order solely for change in purchase price of shingles and time increase, if any, for delays in delivery. Prior to final payment, contractor shall provide owner an additional 100 square feet

of new shingles in original wrapper's for owner's use. All shingles shall be of the same lot # with no significant variation in color, shading, etc.

2.4 UNDERLAYMENT MATERIALS

- A. Self-Adhering Shingle Underlayment: Self-adhering polymer modified bitumen membrane specifically manufactured as a roofing underlayment for ice dams, etc. ASTM D 1970

2.5 ACCESSORIES

- A. Black Plastic Roof Cement: ASTM D 4586
- B. Shingle Nails: ASTM F1667, 11 gauge ring shank galvanized nails, with minimum 3/8 inch diameter head.
 - 1. Length to be as necessary for 1 inch embedment into plywood decking and sheathing.

2.6 METAL FLASHING AND TRIM

- A. Refer to Section 07 50 00.70 - Roofing - Sheet Metal Flashing and Trim.

PART 3 - EXECUTION

3.1 GENERAL

- A. Check shingle wrappers for run numbers. If all shingles for any distinct and complete roof area are not of the same run number, be sure colors match before shingles are applied.
- B. Do not apply shingles which vary in color, shade, or texture. Such variations in appearance will not be acceptable.
- C. Do not apply bent, burred, or otherwise defaced shingles. Do not apply shingles with felt splices or suspected splices.

3.2 SYSTEM SCHEDULE

Refer to Table 1 for a general schedule of the primary roof components (described from the bottom up) for each roof area. Methods of installation and related materials are in other sections of these specifications.

Table 1

| Steep-slope Areas |
|------------------------------------|
| Wood plank deck |
| Self-adhering shingle underlayment |
| Asphalt shingles |

3.3 UNDERLAYMENT INSTALLATION

- A. Clean deck surfaces of all dirt, dust and other foreign matter.
- B. Prior to installing new underlayment, install new metal drip edge. Underlayment felts are to be applied over metal drip edge and under metal rake edge.
- C. Install underlayment perpendicular to roof slope. Lap sides a minimum of 4 inches and ends 6 inches.
- D. Extend underlayment up not less than 4 inches at sidewalls, chimneys, curbs and other roof projections.

3.4 SHINGLE APPLICATION

- A. All shingle application shall be accomplished in strict accordance with the instructions of the shingle manufacturer, except that should there be any conflict between those instructions and the provisions of these specifications, the more stringent shall apply.
- B. Mix shingles as recommended by manufacturer to ensure a uniform blend of colors and textures throughout the roof system.
- C. At all eaves, install starter course of shingles with tabs turned upslope and the butt of the shingle flush with the outer edge of drip edge.
- D. Install first course of shingles at eaves directly over starter course; stagger end joints off those of starter course as required by the shingle manufacturer.
- E. Apply shingles in courses with butt edges straight and aligned the entire width of each course. Stagger cut-outs one-half the width of each tab in alternate courses.
- F. Secure all shingles with specified fasteners in strict accordance with shingle manufacturer's latest printed instructions using not less than 6 fasteners per shingle.
- G. Locate fastener approximately 1 inch above each cutout.
- H. Laminated architectural shingles shall be nailed precisely as required by the manufacturer. Contractor shall ensure that fasteners penetrate all laminations.
- I. All shingles must have tabs sealed.
- J. Next to walls above roof surface along rakes, shingle in metal shingle flashings with shingles. Refer to Section 07 50 00.70 - Roofing - Sheet Metal Flashing and Trim.

WARRANTY

Owner: Moore County Schools

Installer: _____

Location of Building: _____

Name of Building: _____

Roof Area: _____

Date of Substantial Completion: _____

Know all men by these presents, that we, Installer as defined above, having installed shingles and sheet metal work, and having accomplished certain other work on the roof areas identified above under contract between Owner and Contractor, warrant to Owner, with respect to said work that for a period of two years from date of Substantial Completion of said work, the roofing including shingles and sheet metal work, shall be absolutely watertight and free from all leaks, provided however that the following are excluded from this warranty:

Defects or failures resulting from abuse by the Owner.

Defects in design involving failure of (1) structural frame, (2) load-bearing walls, and (3) foundations.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars riots or civil commotion.

We, Installer, agree that should any leaks occur in the roofing we will promptly remedy said leaks in a manner to restore the roof to a watertight condition by methods compatible to the system and acceptable under industry standards and general practice.

We, Installer, further agree that for a period of two years from date of Substantial Completion referred to above, we will make repairs at no expense to the Owner, to any defects which may develop in the work including but not limited to loose or damaged shingles, wrinkles, ridges, splits and loose flashings in a manner compatible to the system and acceptable under industry standards and general practice.

IN WITNESS WHEREOF, we have caused this instrument to be duly executed, this _____ day of _____, 20 _____.

(Installer)

WITNESS:

by _____
President

Notary Public

END OF SECTION

SECTION 07 50 00.60
SBS-MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Two-ply SBS-modified bituminous membrane roofing.
 - 2. Cover board.
 - 3. Roof insulation.
- B. Related Sections include the following:
 - 1. Section 07 50 00.30 - Roofing - Rough Carpentry.
 - 2. Section 07 50 00.40 - Roofing Preparation.
 - 3. Section 07 50 00.70 - Roofing - Sheet Metal Flashing and Trim.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Roof Areas to meet wind pressures as shown on drawings and for the zones listed below:
 - 1. Zone 1: FM 1-90
 - 2. Zone 2: FM 1-90
 - 3. Zone 3: FM 1-120
- C. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- D. Provide a roofing system that complies with the requirements of Underwriters' Laboratories, Inc. for a Class A roof covering. Provide a UL Class A certificate, generated by Roofing System Manufacturer, to Owner at project close-out.

1.5 SUBMITTALS

- A. Materials List: Give written notification of the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain approval prior to placing orders.
 - 1. Submittal of catalog cut sheets, etc. in lieu of the materials list required above is not acceptable. Do not submit cut sheets unless specifically requested.
- B. Base/Wall Flashing Instructions: Submit manufacturer's base/wall flashing installation instructions.
- C. Installation Instructions: Submit manufacturer's latest written installation instructions.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Manufacturer Certificates: Original document signed by a responsible officer of the manufacturing firm, notarized, on manufacturer's standard letterhead, certifying materials furnished for project comply with the referenced standard. Certificate shall specifically reference the project and applicable compliance standard.
- F. Qualification Data: For Installer and manufacturer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
- H. Maintenance Data: For roofing system to include in maintenance manuals.
- I. Warranties: Special warranties specified in this Section.
- J. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
- K. Tapered Insulation Shop Drawings: Submit proposed tapered insulation and cricket system for approval prior to start of work. Provided drawings for each area and include, at a minimum, concise tapered layouts, material identification, cross sections of typical sections with each board labeled, board stagger pattern, slopes and cricket widths.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

- D. Supply and keep all materials dry at all times prior to application.
- E. Store all insulation, insulating board cants, tapered edge strips and lumber/plywood in dry, covered storage, or on platforms, and with weatherproof coverings. Coverings shall be waterproof breathable type material such as heavy canvas. Insulation wrappers are not sufficient. Materials which are not stored under specified covers are subject to removal from the site at Owner's discretion.
- F. Store all roll goods on end on clean floors or platforms. Do not use flattened rolls or rolls with ends damaged.
- G. Materials which, in the opinion of the Owner, have been prematurely exposed to the weather are subject to immediate removal by the contractor and replaced with new materials at contractor's expense. Owner may, at Owner's option, mark such materials with paint or other indelible materials while they remain on-site.
- H. Store solvent bearing materials in dry, cool storage and keep lids tight on partially used containers to prevent escape of solvents.
- I. Store all emulsions in dry storage at temperatures above 40°F.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

- A. Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Special warranty includes roofing membrane, base flashings, roof insulation, fasteners, cover boards, and other components of roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, and walkway products, for the following warranty period:
 - 1. Warranty Period: Two (2) years from date of Substantial Completion.
- C. Manufacturer's Warranty: 20 Year No Dollar Limit from the date of Substantial Completion. Warranty to include base flashings.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Listed in this section are specifications for materials required generally for use in accomplishing the work specified. Materials not listed may also be required.
- B. Except as specifically noted herein, all reference standards included herein are to be presumed to be the latest published editions of such standards available as of the issue date of these specifications.
- C. Brand or manufacturer names are used as standards of quality where no other appropriate reference is available. Submit substitution requests under requirements listed in other Sections.
- D. Where a generic product or a general manufacturer's product is specified and more than one such product is offered by the manufacturer, provide the manufacturer's premium materials.

2.2 MANUFACTURERS

- A. For purposes of these documents, the roof system manufacturer is defined as the manufacturer of the primary roof membrane. The roof system is intended to encompass, but is not necessarily limited to, all components above the deck including underlayment and/or vapor retarder components, roof insulation, roof membrane, membrane flashings and any proprietary flashing/components of the system manufacturer. Subject to compliance with the material specifications of these documents, all materials are to be supplied by the same manufacturer.
- B. All materials used in systems to be covered by a Manufacturer's Guarantee must be supplied by the same manufacturer, unless the manufacturer issuing the guarantee waives this requirement in writing.
- C. The following material manufacturers are approved for this project. Such approval does not relieve the Contractor from the requirement to supply materials which meet all other requirements of these Specifications.
- D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cold Process or Torch-Applied SBS-Modified Bituminous Membrane Roofing:
 - a. Soprema
 - b. Johns Manville
 - c. Siplast

2.3 SBS-MODIFIED ASPHALT-MEMBRANE MATERIALS

- A. Base Ply: ASTM D 5147 and D 6163, Type I or II, Grade S, SBS-modified asphalt sheet with glass fiber mat reinforcing, suitable for application method specified.
- B. Cap Sheet: ASTM D 5147 and D 6163, Type I or II, Grade G, SBS-modified asphalt sheet with glass fiber mat reinforcing, granular surfaced, suitable for application method specified and as follows:
 - 1. Granule Color: White.

- C. Fiberglass Base Sheet: ASTM D4601, Type II, unperforated, asphalt impregnated and coated, glass-fiber sheet, dusted with mineral surfacing on both sides.
- D. Slip Sheet: Building paper, 3 lb/100 sq. ft.

2.4 BASE FLASHING SHEET MATERIALS

- A. Backer Sheet: ASTM D 6164, Grade S, Type I, polyester-reinforced, SBS-modified asphalt sheet; granular surfaced; suitable for application method specified.
- B. Flashing Sheet: ASTM D 6298 fiberglass reinforced, SBS-modified asphalt sheet; suitable for application method specified, and as follows:
 - 1. Aluminum Clad.

2.5 AUXILIARY ROOFING MEMBRANE MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.
- B. Cold adhesive as recommended by the manufacturer for adhering SBS-modified bitumen membrane systems.
- C. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
- D. Liquid Membrane Flashing System: Seamless liquid membrane with reinforcing polyester fleece to meeting roofing system manufacturer's warranty.
- E. Asphalt Primer: ASTM D 41.
- F. Metal Flashing Sheet: Metal flashing sheet is specified in Section 07 50 00.70 - Roofing - Sheet Metal Flashing and Trim.
- G. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing membrane.
- H. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.6 INSULATION/BOARD GOODS

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Insulation Cant Strips: ASTM C 208, wood fiberboard cut to fit at 45° with minimum 4-1/2" face.
- C. Tapered Edge Strips: ASTM C 208, wood fiberboard 1-1/2 inches at edges.

- D. Polyisocyanurate Roof Insulation: ASTM C 1289, Type II, with felt or glass-fiber mat on both major surfaces, manufactured to meet the following requirements:
 - 1. Nominal Compressive Strength: 20 psi.
 - 2. Dimensional Stability: 2% maximum linear change when conditioned at 158°F and 97% relative humidity.
 - 3. Minimum Curing Time: 24 hrs. plus 24 hrs. for each inch of thickness at a minimum of 60°F before shipment from manufacturer.
 - 4. Maximum Board Thickness: as indicated.
 - 5. Maximum Board Size: 4' x 8' (mechanically attached).
 - 6. Maximum Board Size: 4' x 4' (adhered).

- E. Cover Board: ASTM C 1289, high density polyisocyanurate, to be used as cover board and underlayment.
 - 1. Product: Subject to compliance with requirements
 - 2. Cover board: 1/2-inch- thick, max board size 4' x 4'

- F. Insulation Adhesive: Two component, low rise polyurethane foam, approved by membrane manufacturer for insulation and substrates on this project.

- G. Termination Bar: Extruded aluminum bar, 1 inch wide, 1/8-inch-thick, with pre-punched holes at 6 inches on center.

2.7 FASTENING DEVICES

- A. Galvanized Steel Roofing Nails: 11 or 12-gauge hot dipped galvanized steel ring shank roofing nails, minimum 3/8-inch diameter head as manufactured by W. H. Maze Company. Minimum length 1½ inches.

- B. Masonry Anchors: Drive-pin fastener with alloy sleeve and stainless-steel nail insert for use in concrete, brick or concrete masonry units, 1/4-inch diameter, 1-inch length, flat head.

- C. Insulation fasteners and plates: Plated steel fasteners and 3-inch diameter round or square plate as manufactured by or specifically recommended by the roof system manufacturer. Fasteners and plates must be factory-mutual approved for 1-90 and 1-120 construction with the specified insulation.

PART 3 - EXECUTION

3.1 GENERAL SCHEDULE

- A. Refer to Tables below for a general schedule of the primary roof components (described from the bottom up) for each roof area. Methods of installation and related materials are in other sections of these specifications.

B.

| <u>Table 3-1 VASS LAKEVIEW ELEMENTARY</u> | |
|---|--|
| concrete (existing) | Plywood tongue-and-groove wood plank deck (existing) |
| 2.5-inch polyisocyanurate | Rosin/Fiberglass base sheet (mechanically attached) |
| 2.5-inch polyisocyanurate (mechanically attached) | |
| 1/4" per foot tapered insulation: 1/2" starting thickness (adhered) | |
| Cover board (adhered) | |
| Base ply | Base ply |
| Cap sheet | Cap sheet |

| <u>Table 3-2 SANDHILLS FARM ELEMENTARY</u> | |
|--|---|
| Tongue-and-groove wood plank deck (existing with structural slope) | Tongue-and-groove wood plank deck (existing) |
| 2.5-inch polyisocyanurate | 2.5-inch polyisocyanurate (loose) |
| 2.5-inch polyisocyanurate (mechanically attached) | 2.5-inch polyisocyanurate (mechanically attached) |
| Cover board (adhered) | 1/4" per foot tapered insulation: 1/2" starting thickness (adhered) |
| Base ply | Cover board (adhered) |
| Cap sheet | Base ply |
| | Cap sheet |

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
 2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Inspect all surfaces to receive work specified herein. Application of materials constitutes approval of the substrate as being satisfactory.

3.3 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Do not apply bituminous materials when ambient air temperature is below 40°F unless equipment can be operated, and materials handled, without exceeding maximum allowable temperatures and without damage to materials, and then only with approval of the Engineer.
- C. Do not apply emulsions when ambient air temperature is below 40°F or is expected to be below freezing within 24 hours after application.
- D. Accomplish application of roofing materials so that each area will be complete at the end of each workday.
- E. Protect edges and incomplete flashings against water entry at all times. Remove cut-offs and temporary protection prior to resumption of work.
- F. Prime all concrete, masonry and metal surfaces to receive bituminous materials, using approximately one gallon of primer per 100 square feet of surface. Allow primer to dry thoroughly before application of bituminous materials.
- G. Set insulating board cant strips and tapered edge strips in a generous bed of plastic roof cement so that they are tightly cemented to both horizontal and vertical surfaces.
- H. Torch apply base ply and base flashing.
- I. Torch Operations: For a minimum of two (2) hours following daily completion of torch applications, maintain a fire watch inside and outside the building in the area of torch application. Utilize a fully-functional hand-held infrared device suitable for detecting areas of elevated temperature.
- J. Provide kettles with accurate working thermometers or provide a hand thermometer for the kettle operator with instructions for use. When using a hand thermometer, take kettle temperature at furthest point from burner stacks or at draw-off spigot.

3.4 BASE SHEET APPLICATION

- A. Clean deck surfaces of all dirt, dust and other foreign matter.
- B. Apply next to deck one ply of rosin-sized sheathing paper. Lap sides 4 inches and ends 6 inches. Nail sufficiently to hold in place with specified fasteners.
- C. Starting at low points in roof, apply fiber glass base sheet perpendicular to slope, lapped at least 4 inches at sides and 6 inches at ends.
- D. Fasten base sheet through center of sheet in two staggered rows spaced approximately 11 inches apart and through laps with specified fasteners. Space fasteners as follows:
 - 1. Field of Roof: **<Insert spacing>** inches on center at laps, **<Insert spacing>** inches on center at intermediate rows. Field of roof is defined as all areas of roof except perimeter, corners **[, and extended corners]**.

2. Perimeter: <Insert spacing> inches on center at laps, <Insert spacing> inches on center at intermediate rows. Perimeter of roof is defined as all exterior edges and is <Insert width> feet wide unless indicated otherwise on Drawings.
3. Corners: <Insert spacing> inches on center at laps, <Insert spacing> inches on center at intermediate rows. Corners of roof occur at all perimeter locations where changes in direction occur and are <Insert dimensions> in size unless indicated otherwise on Drawings.

- E. Extend base sheet to top of all cants and cement or fasten securely to the face of the cant.
- F. Terminate base sheet at face of all vertical surfaces.

3.5 INSULATION BASE LAYER APPLICATION

- A. Install new insulation as specified herein.
- B. Clean substrate of dust and debris.
- C. Place insulation units without adhering.
- D. Apply insulation with end joints staggered approximately one-half the length of units.
- E. Fit all insulation units snugly to each other and to vertical surfaces.
- F. Remove and replace all damaged units with new insulation units or repair to provide a smooth and uniform surface.

3.6 INSULATION AND COVER BOARD APPLICATION

- A. Apply insulation and cover board layers as specified herein:
 1. Bottom layer of insulation to be mechanically attached with fasteners to the wood deck.
 2. Succeeding insulation and cover board to be adhered in insulation ribbon adhesives.
- B. Where insulation is to be mechanically attached, fasten with specified fasteners through steel plates into deck at the rates required to meet the specified wind uplift assembly ratings.
- C. Install taper insulation as specified herein:
 1. Form tapered insulation system using factory tapered polyisocyanurate insulation units and polyisocyanurate insulation fill units.
 2. Provide a completed slope of 1/4 inch per foot.
 3. Start tapered insulation system at eaves and increase insulation thickness toward high points. Provide a minimum insulation thickness at eaves of inches above the roof deck.
- D. Ensure full adhesion of all layers of insulation and cover board take whatever steps necessary to achieve full adhesion including, temporary ballasting of insulation and cover board until adhesive sets.
- E. Where insulation and cover board are to be adhered, clean surfaces of all dirt, dust and other foreign matter.

- F. Install insulation and cover board using 3/4-inch wide ribbons of adhesive. Apply adhesive in ribbons at spacings indicated below.
 - 1. Field and perimeters: Meeting FM 1-90
 - 2. Corners: Meeting FM 1-120
 - 3. Refer to drawings for wind zone locations.
 - 4. Contractor shall employ all additional methods and procedures as necessary to ensure insulation units and cover board units are fully adhered to the substrate including applying additional adhesive along edges, ballasting insulation units, installing mechanical fasteners at insulation and cover board corners, etc. Walk boards into the adhesive and roll using 30-inch wide, 100-150 pound weighted steel roller.

- G. Stagger all joints off those of preceding layer.

- H. Apply insulation and cover board with end joints staggered approximately one-half the length of units.

- I. Fit all insulation and cover board units snugly to each other and to all vertical surfaces.

- J. Remove and replace all damaged units with new insulation and cover board or repair to provide a smooth surface and uniform insulation thickness.

- K. Place insulation and cover board into adhesive shortly after it has reached its maximum rise and walk into place.
 - 1. Walking insulation board in immediately after placement into adhesive may cause slippage/movement until adhesive starts to set.

- L. Install insulation crickets as follows:
 - 1. Form crickets along the upslope side of all curb mounted equipment with base widths exceeding 12 inches using factory tapered polyisocyanurate insulation and fill units and tapered edge strips.
 - 2. Form crickets between drains using factory tapered polyisocyanurate insulation units, polyisocyanurate insulation fill units and tapered edge strips.
 - 3. Install crickets of sufficient size and slope as required to ensure complete drainage and prevent standing water. Fabricate full crickets between drains with a minimum width-to-length ratio of 0.5. Fabricate partial crickets with dimensions which would result in a minimum width-to-length ratio of 0.5 if they were extended to full size.
 - 4. Fabricate crickets to be sufficiently wide to result in valleys with positive slopes of not less than 1/16:12.
 - 5. At a minimum, fabricate crickets to provide an installed slope matching that of adjacent roof slope.
 - a. Unless noted otherwise, fabricate all crickets from tapered stock as required to provide an installed slope matching that of the adjacent roof area. For example, where the roof slope is 3/8-inch per foot, fabricate crickets from tapered stock to provide an installed slope of 3/8-inch per foot.
 - 6. Start cricket construction by striking chalk lines for outer edges of tapered edge strips. Install edge strips along chalk lines, mitering and fitting at the points where lines break.
 - 7. Provide a minimum tapered polyisocyanurate thickness of 1/2 inch along edges of crickets. Taper edges of crickets down to base insulation using continuous wood fiber board tapered edge strips. Secure tapered edge strips with two (2) rows of insulation adhesive.
 - 8. Complete cricket assembly using factory tapered polyisocyanurate insulation.
 - 9. Secure cricket insulation in ribbons of insulation adhesive.

10. Installed tapered edge strips along edges of cricket valleys to ensure smooth transition.
- M. Taper insulation down to drains using tapered edge beginning at a point approximately 24 inches from drain. Provide larger sumps where drains are outside the drain valley. Secure sump insulation using insulation adhesive.
1. A minimum thickness of 2” insulation is required to be extended into the drain sump area.
- N. Install cover board over all insulation and crickets. Set in adhesive as described previously.
- 3.7 ROOFING MEMBRANE INSTALLATION (GENERAL)
- A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."
- B. Clean surfaces of all dirt, dust and other foreign matter.
- 3.8 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION
- A. Install modified bituminous roofing membrane sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system, installing as follows:
1. Fully adhere base ply to substrate utilizing hot application. Fully adhere cap sheet utilizing torch application.
 2. Alternatively, fully adhere base and cap sheet to substrate utilizing cold adhesive.
 3. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer.
 4. Cut rolls in maximum 18-foot lengths.
 5. Apply new SBS modified bitumen material, suitable for application method specified, in strict accordance with manufacturer's latest printed instructions except as modified in this section.
 6. Apply pressure on the sheet to ensure full contact with the substrate and complete adhesion.
 7. At roof edges and openings, terminate roofing sheets at the outer edge of blocking.
- B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps a minimum of 36 inches. Completely bond and seal laps. For cold-applied application (Alternate No. 1) utilize hot-air welding techniques, leaving no voids.
1. Repair tears and voids in laps and lapped seams not completely sealed.
 2. Apply roofing granules to cover exuded bead at laps.
 3. Lap ends at least 6 inches and sides at least 3 inches.
- C. Install roofing membrane sheets so side and end laps shed water.
- D. At internal roof drains, extend roofing sheets across drain body opening. Do not allow interply bitumen to enter drain bowl. Cut sheets across drain body opening and trim flush with the inside face of the drain body.

3.9 BASE FLASHING INSTALLATION

- A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates under cap sheet according to roofing system manufacturer's written instructions and as follows:
 - 1. Prime substrates with asphalt primer if required by roofing system manufacturer.
 - 2. Flashing Sheet Application: Torch flashing sheet to substrate as required by roofing system manufacturer.
- B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 4 inches onto field of roofing membrane.
- C. Install roofing membrane cap-sheet stripping where metal flanges and edgings are set on membrane roofing according to roofing system manufacturer's written instructions.
- D. At masonry substrates, fasten top of flashing with approved fasteners through continuous termination bar on a line approximately 1 inch below top edge and spaced not over 6 inches on center
- E. At locations where wall is to be covered with base flashing material and exceeds 12 inches in height above roof surface, install wall flashings as recommended by the roofing system manufacturer. Nail top edge of wall flashings and laps at 4 inches on center using flashing nails. Lap wall flashing over base flashing minimum of 4 inches. Torch to substrate using manufacturer approved application methods.
- F. Check all laps as required by the manufacturer's specifications, reheat and seal as required to obtain full adhesion.

3.10 LIQUID MEMBRANE FLASHING SYSTEM

- A. Utilize liquid membrane flashing system as alternate flashing means only at locations where pipe penetration is securely fastened and per manufacturer's requirements.
 - 1. Follow manufacturer's latest printed installation instructions. Refer to Drawings. Submit three (3) copies to Engineer prior to start of work.
 - 2. Prep surfaces as required by roofing system manufacturer. Install sealant to fill voids where roofing membranes terminate at penetrations.
 - 3. Using masking tape, mask the perimeter of the area to receive the flashing system. Apply resin primer to substrates requiring additional preparation and allow primer to set.
 - 4. Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.
 - 5. Apply an even, generous base coat of flashing resin using a roller at the minimum rate specified by the resin manufacturer to prepared surfaces requiring flashing coverage. Work the fleece into the wet, catalyzed resin using a brush or roller to fully embed the fleece in the resin and remove trapped air. Lap fleece layers a minimum of 2 inches and apply an additional coat of catalyzed resin between layers of overlapping fleece. Again, using a roller, apply an even top coat of catalyzed resin at the minimum rate specified by the resin manufacturer immediately following embedment of the fleece, ensuring full saturation of the fleece. Ensure that the flashing resin is applied to extend a 0.25 inch beyond the fleece. Remove the tape before the catalyzed resin sets. Make allowances for saturation of roller covers and application equipment.
 - 6. Should work be interrupted for more than 12 hours or the surface of the catalyzed resin becomes dirty or contaminated by the elements, wipe the surface to be lapped with new flashing resin

using the specified cleaner/solvent. Allow the surface to dry for a minimum 20 minutes and a maximum 60 minutes before continuing work.

7. Apply the color finish over the installed field membrane after the membrane is set, dry and has been in place for a minimum 2 hours.
8. Using the specified cleaner/solvent, wipe field surfaces to receive the color finish layer. Allow the surface to dry for a minimum 20 minutes before continuing work.
9. Apply an even top coat of catalyzed color finish resin at the minimum rate specified by the resin manufacturer. Allow 2 hours cure time prior to exposing the membrane to foot traffic.

3.11 TORCH OPERATIONS

- A. All torch operations are to comply with Certified Roofing Torch Applicator (CERTA) and NRCA requirements. Torch operators shall be fully certified by CERTA. Contractor shall provide copy of certification for all torch applicators.
 1. For a minimum of two hours following daily completion of torch applications, maintain a fire watch inside and outside the building in the area of torch application. Utilize a fully-functional hand-held infrared device suitable for detecting areas of elevated temperature.
 2. Contractor shall maintain two (2) fully operational fire extinguishers at the site at all times.
 3. Apply two-ply base flashing backer sheet at wood curbs. Take all measures necessary to protect wood curbs from open flames.
- B. Contractor shall use “torch-and-flop” method at all base flashings.

SBS-MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM WARRANTY
(on Contractor’s Standard Letterhead)

Owner: Moore County Schools

Installer: _____

Location of Building: _____

Name of Building: _____

Roof Areas: _____

Date of Substantial Completion: _____

Know all men by these presents, that we, Installer as defined above, having installed insulation, roofing, flashings and sheet metal work, and having accomplished certain other work on the roof areas identified above under contract between Owner and Contractor, warrant to Owner, with respect to said work that for a period of two (2) years from date of Substantial Completion of said work, the roofing including underlayment and cover boards, insulation, roofing membrane, flashings and sheet metal work, shall be absolutely watertight and free from all leaks, provided however that the following are excluded from this warranty:

Defects or failures resulting from abuse by the Owner.

Defects in design involving failure of (1) structural frame, (2) load-bearing walls, and (3) foundations.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars riots or civil commotion.

We, Installer, agree that should any leaks occur in the roofing we will promptly remedy said leaks in a manner to restore the roof to a watertight condition by methods compatible to the system and acceptable under industry standards and general practice.

We, Installer, further agree that for a period of two (2) years from date of Substantial Completion referred to above, we will make repairs at no expense to the Owner, to any defects which may develop in the work including but not limited to open laps, blisters, wrinkles, ridges, splits, warped insulation, and loose flashings in a manner compatible to the system and acceptable under industry standards and general practice.

IN WITNESS WHEREOF, we have caused this instrument to be duly executed, this _____ day of _____, 20 _____.

(Installer)

WITNESS:

by _____
President

Notary Public

The undersigned named Owner agrees, from the date of acceptance of the project, to maintain the roof in accordance with the manufacturers written requirements and agrees to avoid damage to the roof surface by any parties under his control working or walking on the roof. The Owner recognizes his responsibility to inspect the roof semi-annually.

Owner Date

END OF SECTION

SECTION 07 50 00.70
ROOFING - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Sheet metal flashing and trim.
 - 2. Sheet metal wall panels.
- B. Related Sections include the following:
 - 1. Division 7 Section “SBS-Modified Bituminous Membrane Roofing.”
 - 2. Division 7 Section "Shingle Roofing."

1.3 SUBMITTALS

- A. Materials List: Give written notification of the brand name and manufacturer of each material proposed for use and include a statement that all proposed materials meet the specification requirements. Obtain approval prior to placing orders.
 - 1. Submittal of catalog cut sheets, etc. in lieu of the materials list required above is not acceptable.
- B. Submit shop drawings of all specified types of metal shapes, showing details of proposed installation where appropriate.
- C. Submit two 6-inch long samples of each metal shape.
- D. Manufacturer Certificates: Original document signed by a responsible officer of the manufacturing firm, notarized, on manufacturer’s standard letterhead, certifying materials furnished for project comply with the referenced standard. Certificate shall specifically reference the project and applicable compliance standard.
- E. Obtain approval of shop drawings, samples and certifications prior to fabrication and installation.
- F. No sheet metal item is to be purchased, fabricated, or installed until all required shop drawings and related submittals for each item are approved. Items purchased, fabricated and/or installed which are not in compliance with approved shop drawings are subject to immediate removal from the project at contractor’s expense.
- G. Color Chart: Manufacturer’s standard range of colors for prefinished metals, including available gauges.

1.4 STORAGE

- A. Restrict on-site storage to minimum for work in progress. Protect all stored metal from exposure to weather and physical damage.

1.5 WARRANTIES

- A. Upon completion of the work, furnish from manufacturer a standard twenty (20) year finish warranty.
- B. Finish: Deterioration includes, but is not limited to, the following:
 - 1. Color fading more than 5 Hunter Units when tested according to ASTM D 2244.
 - 2. Chalking in excess of a No. 8 Rating when tested according to ASTM D 4214.
 - 3. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- A. Aluminum-Zinc (Galvalume) Alloy-Coated Steel Sheet: ASTM A 792/A792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
- B. Stainless Steel: ASTM A 167, chromium-nickel steel sheet, AISI Type 304.
- C. Solder: ASTM B 32 with 50% lead and 50% tin unless otherwise specified herein.
- D. Lead: 4 lb. soft lead.
- E. Exposed Finish: Kynar® 500 based fluoropolymer coating, containing not less than 70% polyvinylidene fluoride resin by weight. Mask metal with protective plastic film.
 - 1. Color: As selected by Owner from manufacturer’s full range of colors.
- F. Sealant: ASTM C920, Type S, Grade NS, Class 25, one-part urethane sealant.

2.2 AUXILIARY MATERIALS

- A. Counterflashing: 24 ga. prefinished galvalume
- B. Coping Caps: 24 ga. prefinished galvalume
- C. Downspouts: 24 ga. prefinished galvalume
- D. Edge Metal: 24 ga. prefinished galvalume
- E. Gutter: 24 ga. prefinished galvalume
- F. Cleat: 22 ga. Prefinished galvalume
- G. Metal Cover: 22 ga. Prefinished galvalume

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Inspect all surfaces to which metal is to be applied. Do not install metal unless surfaces are even, sound, clean, dry and free from defects that might affect the application.
- B. Follow recommendations of Sheet Metal and Air Conditioning Contractors National Association Architectural Sheet Metal Manual (Seventh Edition) for fabricating in-shop and on-site, and for installation, unless otherwise specified herein or on Drawings.
- C. Follow published instructions of the product manufacturer for installation of extruded or proprietary metal products, unless otherwise specified herein or on Drawings.
- D. Use nails, screws, bolts, cleats or other fasteners of the same material or, if approved by Engineer, of material chemically compatible with the contacted metal.
 - 1. Use stainless steel fasteners at all locations in contact with pressure-treated lumber.
- E. Fabricate cleats to be a minimum one gauge heavier than metal to be secured by cleat unless otherwise noted.
 - 1. Secure cleats to substrate with fasteners specifically manufactured for the purpose at spacings of 6 inches, on center. Fasteners are to be manufactured of metal chemically compatible with the contacted metal. Fasteners to be used in wood substrates are to be ring shank. Fasteners are to be located as close to hem of cleat as practical but no more than 2 inches from hem unless specifically indicated otherwise herein or on drawings.
- F. Solder metal, where required, using standard industry techniques in accordance with the requirements of the metal manufacturer and the SMACNA Architectural Sheet Metal Manual for the types of metal to be soldered. Joints shall be thoroughly sweated to ensure full penetration of solder in the joint and to ensure a secure connection. Riveted joints shall be fully soldered to eliminate rivet holes or potential for corrosion.
- G. Install metal to be water and weathertight with lines, arises and angles sharp and true and with plane surfaces free of waves or buckles. All raw edges of exposed or finish sheet metal shall be hemmed.
- H. Install shop-formed flashings in 10-foot lengths maximum and with minimum number of pieces in each straight run.
- I. Do not place dissimilar metals in direct contact or in positions where water sheds across both metals.
- J. Where aluminum is in contact with masonry or concrete, coat the contacting surface with bituminous paint.
- K. Miter and seal all inside and outside corners of coping caps. Shop fabricated corner pieces are preferable.
- L. Shop form all metal shapes, which are to be formed of prefinished metal, with protective plastic film in place. Do not remove plastic film until just prior to (or, if possible, after) installation.
- M. At all corners, shop form corner pieces of coping caps with 18-inch legs (joints no more than 18 inches from corner).

- N. Form faces of coping caps and gravel stop with vertical faces of sufficient width to extend a minimum of 1-1/2 inches below wood blocking.

3.2 COUNTERFLASHING INSTALLATION

- A. Install new counterflashings as specified herein. Refer to SMACNA Architectural Sheet Metal Manual Figure 4-6 and Drawings.
- B. Secure counterflashing to vertical surface with appropriate fasteners spaced 9-inches on center.
- C. Refer to sheet metal schedule for gauge and metal type.
- D. Install butyl sealant behind counterflashing.
- E. Notch and lap joints and inside corners. Notch and seam outside corners. Do not rivet or otherwise secure joints and corners.
- F. Lap ends of counterflashing 4 inches. Crimp hem of overlapping section around hem of underlapping section.
- G. Fill sealant cove to full depth with permanent, non-shrinking sealant.

3.3 EDGE METAL INSTALLATION

- A. Install new edge metal as specified herein. Refer to SMACNA Architectural Sheet Metal Manual Figure 2-1 and drawings.
- B. Refer to sheet metal schedule for gauge and metal type.
- C. At edges where gutters are required, install gutters before edge metal.
- D. Fabricate edge metal with flange width no wider than the width of the blocking less 1/2 inch and not less than 4 inches.
 - 1. At draining edges, fabricate lip to be 1/2-inch high above flange.
 - 2. At non-draining edges, fabricate lip to be 3/4-inch high above flange.
- E. Apply a strip of self-adhering membrane across the top of the blocking over roof membrane and extending down the outside face approximately the width of the vertical section of the edge metal. Use strips as long as practical, lapping the ends 6 inches.
- F. Engage formed drip at lower edge of face with continuous cleat. Refer to drawings and SMACNA Architectural Sheet Metal Manual Figure 2-1, Detail 1.
- G. Leave a 1/4 inch opening between sections. Center the cover plate over the opening, nail with two nails through opening between sections. Refer to SMACNA Architectural Sheet Metal Manual Figure 2-5A.
- H. Nail through flange near center. Space nails 3 inches on center in a staggered pattern. Refer to SMACNA Architectural Sheet Metal Manual Figure 2-1.
- I. Where fascia extensions are installed, stagger fascia extension joints midway between joints of edge metal. Provide stiffening ribs where shown on drawings.

3.4 BASE FLASHING CLOSURE INSTALLATION

- A. Install new base flashing closures where base flashings abruptly end as specified herein. Refer to Drawings.
- B. Refer to sheet metal schedule for gauge and metal type.
- C. Completely seal all joints to be watertight.
- D. Install closures over roof membrane and under base flashings.
- E. Extend closures up under counterflashings, where present or specified.
- F. Install closures to completely seal ends of base flashings, membrane and cants as well as end joints of edge metal or drip edge, if present.

3.5 GUTTER INSTALLATION

- A. Install new free-floating gutters at locations as specified herein and on Drawings. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-2 Style A and Drawings.
- B. Refer to sheet metal schedule for gauge and metal type.
- C. Size gutters as shown on Drawings.
- D. Provide prefinished galvanized steel gutter brackets sized at 1/4 inch by 1-1/2 inch spaced 3 feet on center. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-13A and drawings. Prime and paint using products manufactured for the purpose.
 - 1. Color to be selected by Owner from manufacturer's full range of colors.
 - 2. Secure brackets using two screws. Do not secure gutters with fasteners.
- E. Provide prefinished galvanized steel gutter spacers sized at 1 inch by 1/8 inch spaced 3 feet on center. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-13A and drawings. Prime and paint using products manufactured for the purpose.
 - 1. Color to match gutters.
- F. Provide butt-type expansion joints in gutters at 40-foot maximum intervals. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-7.

3.6 DOWNSPOUT INSTALLATION

- A. Install new downspouts at gutters as specified herein. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-32B and drawings
- B. Refer to sheet metal schedule for gauge and metal type.
- C. Size downspouts as shown on Drawings.
- D. Install downspouts at locations shown on drawings.

- E. Form downspout hangers from the same material as downspouts using material not less than two (2) gauges heavier than downspouts.
- F. Secure downspouts to wall with hangers spaced not more than 5 feet on center. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-35C and drawings.
- G. Connect downspouts to outlet tubes. Refer to SMACNA Architectural Sheet Metal Manual Figures 1-24C and 1-33, Detail 1 and drawings.
- H. Where downspouts terminate at underground downspout boots, insert into boot at least 4 inches. Provide new square-to-round transition pieces to match downspouts.
- I. Furnish and install concrete splash blocks where downspouts terminate at grade and roof surfaces. On roof surface, install over walk pad.

3.7 COPING CAP INSTALLATION

- A. Install new coping cap at parapet walls as specified herein. Refer to SMACNA Architectural Sheet Metal Manual Figure 3-4A.
- B. Refer to sheet metal schedule for gauge and metal type.
- C. Prior to installation of coping cap, apply a strip of self-adhering membrane across the top of the blocking and extending down the outside and inside face approximately the width of the vertical sections of the coping cap. Use strips as long as practical, lapping the ends 6 inches.
- D. Secure both vertical sections with a continuous cleat nailed to wood blocking. Use drive pins for securement into masonry or concrete.
- E. Refer to SMACNA Architectural Sheet Metal Manual Figure 2-1, Detail 1 for cleat and coping hem dimensions.
- F. Join sections with drive cleats and caulk with approved sealant. Refer to SMACNA Architectural Sheet Metal Manual Figure 3-1, Detail 2.
- G. At coping cap terminations at higher walls, turn coping cap up vertical 4", seal, and fasten. Provide surface-mounted counterflashing.

3.8 METAL COVER INSTALLATION

- A. At wood fascias at eave conditions, install new metal covers as specified herein
- B. Vertical leg to extend full height of wood fascia and blocking.
- C. Lap sections a minimum of 1 inch and seal within lap continuously.
- D. Secure using specified fasteners at top edge at 12 inches on center.
- E. Provide a drip edge at lower end and seal behind lower leg.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

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. Fabrication and installation of sheet metal flashings and trim to provide a permanently watertight condition. 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 and roof insulation requirements.
 - 5. Section 07 71 23 - Manufactured Gutters and Downspouts.
 - 6. Section 07 72 33 - Roof Hatches.
 - 7. Section 07 90 00 - Joint Protection: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.3 REFERENCE STANDARDS

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
 - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2015.
 - 3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
 - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
- B. 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.
- 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; 2015.
 2. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
 3. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
 4. ASTM B101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction; 2012.
 5. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
 6. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
 7. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2012.
 8. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2014.
 9. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
 10. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.
 11. ASTM D1005 - Standard Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers; 1995.
 12. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments; 2008.
 13. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing; 2015a.
 14. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2016.
 15. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2007.
 16. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2012).
 17. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).
 18. 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; 2013.
- D. National Roofing Contractors Association (NRCA):
1. NRCA Roofing and Water Proofing Manual, 5th Edition, 2001.
- E. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
1. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section and in conjunction with roofing pre-installation meeting.

1.5 SUBMITTALS

- A. See Section 01 33 00 - Submittal procedures.

- B. Product Data: Submit product data for all materials specified certifying material complies with all 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.
 - 2. Roof Edge.
 - 3. Counterflashing and Counterflashing Receiver assembled.
 - 4. Fascia.
 - 5. Exposed Fasteners.
 - 6. Through Wall Scupper with exterior Escutcheon.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in sheet metal work with ten (10) years of documented experience.
- B. Contractor Qualifications: Company specializing in sheet metal work with ten (10) years of documented experience.
- C. Contractor of the work of this Section is to be the same as the installer of the work of Section 07 54 23 - Thermoplastic-Polyolefin Roofing

1.7 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.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Protect building and its components from the elements at all times during the project.

1.9 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 allow continuity of work without delays.

1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Factory Applied Metal Finishes Warranty:
 - 1. Provide manufacturer's twenty (20) year finish warranty in which manufacturer agrees to repair finish or replace metal that shows evidence of deterioration of factory applied finish within specified warranty period.
 - 2. Deterioration includes, but is not limited to:
 - a. Color fading in excess of 5 delta E Hunter color units in accordance with ASTM D2244.
 - b. Peeling, checking, or cracking of coating adhesion to metal.
 - c. Chalking in excess of a No. 8 in accordance with ASTM D4214, Method A.
 - d. Corrosion of substrate in excess of a No. 6 on cut edges and a No. 8 on field surfaces, when measured per ASTM D1654.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall 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 shall 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's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
 - 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. Sheet Metal Flashing and Trim Manufacturers:
 - 1. Architectural Products Company.
 - 2. Heckmann Building Products, 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 Co.
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. Aluminum Sheet (Mill Finish): ASTM B209 (ASTM B209M), 3003 or 3005 alloy, H12 or H14 temper.
- C. Aluminum Sheet (Pre-Finished): ASTM B209 (ASTM 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: As selected by Architect for manufacturer's full range.
 - d. Gloss: As 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.
- D. Stainless Steel: ASTM A666, Type 304 alloy, soft temper.
1. Finish:
 - a. No. 4 - Brushed finish.
- E. Protective Film: Factory apply a 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 as selected by Architect.
- 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 slopped top.
 - 6. Surface: Smooth.
 - 7. Color: As selected by Architect from full range of options.

2.6 ROOF EDGE FASCIA

- A. Manufactured system in section lengths not less than 10 feet (12 feet preferred); concealed anchorage; with corner units, and concealed splice plates. All exposed components 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: As selected by Architect from full range of options.

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 (ASTM B209M), 3003 or 3005 alloy, H12 or H14 temper.
 - 2. When indicated on Drawings, fabricate scupper sleeve with polymer clad metal for watertight bond to roofing membrane and flashing.
 - 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 as selected by Architect from full range of options.

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 for securement and interlocking 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 finish 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 shall 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, 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 shall 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 shall meet all minimum requirements published by the membrane Manufacturer in addition to all requirements specified and detailed herein.
- E. Coping and trim sections shall expand and contract freely while mechanically locked in place on anchor cleats.
- F. Coping and trim sections shall lock 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 shall 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 and 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 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; 2021a.
 - 2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
 - 3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a, Reapproval 2017.
 - 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 (Warnock Hersey Listed):
 - 1. WH - Certification Listings.
- D. Underwriters Laboratories Inc. (UL):
 - 1. UL - Fire Resistance Directory.
 - 2. UL 263 - Standard for Safety Fire Tests of Building Construction and Materials; 2011, Revisions 2021.
 - 3. UL 1479 - Standard for Safety Fire Tests of Through-Penetration Firestops; 2015, Revisions 2021.
 - 4. UL 2079 - Standard for Safety Tests for Fire Resistance of Building Joint Systems; 2015, Revisions 2020.

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 or WH 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 gage 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 cfm per foot 0.30 inches water gage pressure differential
- E. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage 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 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 or WH 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 sealants and joint backing, 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; 2022.
 - 2. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle); 2022.
 - 3. ASTM C834 - Standard Specification for Latex Sealants; 2017.
 - 4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
 - 5. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
 - 6. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2016; Reapproval 2021.
 - 7. ASTM D1056 - Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber; 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.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with 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. Samples for Initial Selection: Submit two (2) sets of samples of manufacturer's full range of colors and finishes for each joint protection product indicated for Architect's initial selection.
 - 1. Exterior Wall Applications: Provide for custom color selection by Architect.
- D. 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.
- E. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- F. Indoor Air Quality Certificates:
 1. Certify volatile organic compound content for each interior sealant and related primer.
- G. Warranty Sample: As specified in this section.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

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. Provide 20 year manufacturer's weatherseal and non-staining warranty.
- C. Warranty: Include coverage for replacement of installed sealant and accessories for adhesion and cohesion failure, degradation of sealant, failure of sealant to cure, failure to maintain watertight seal, and staining of substrate.

PART 2 PRODUCTS

2.1 JOINT SEALERS

- A. Silicone Sealant: ASTM C920, Grade NS, Class 25; single component, neutral curing, non-sagging, non-staining, fungus resistant, non-bleeding.
 1. Manufacturers:
 - a. Dow Chemical Company.
 - b. General Electric Company, Silicone Products Division
 - c. Pecora Corporation.
 2. Basis of Design: Dow Chemical Company.
 3. Color: Colors as selected by Architect from full range.
 4. Movement Capability: Plus and minus 25 percent.
 5. Service Temperature Range: -65 to 180 degrees F.
 6. Shore A Hardness Range: 15 to 35.
- B. Acrylic Sealant: ASTM C920, Grade NS, Class 12-1/2; single component, solvent curing, non-staining, non-bleeding, non-sagging.
 1. Manufacturers:
 - a. Master Builders Solutions, formerly BASF.

- b. Pecora Corporation.
 - c. Sika Corporation.
 - d. Tremco.
 2. Basis of Design: Master Builders Solutions.
 3. Color: White.
 4. Movement Capability: Plus and minus 12-1/2 percent.
 5. Service Temperature Range: -13 to 180 degrees F.
 6. Shore A Hardness Range: 25 to 50.
 7. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with CDPH Standard Method VOC V1.2.
- C. Self-Leveling Silicone Sealant: ASTM C920, Grade P, Class 25; single component, chemical curing, non-staining, non-bleeding, self-leveling type.
 1. Color: Gray.
 2. Movement Capability: Plus and minus 25 percent.
 3. Service Temperature Range: -40 to 180 degrees F.
 4. Shore A Hardness Range: 20 to 35.
- D. Polyurethane Sealant: ASTM C920; polyurethane based, non-sag elastomeric sealant; Grade NS, Uses M and A; single or multi-component; paintable.
 1. Manufacturers:
 - a. Master Builders Solutions, formerly BASF.
 - b. Sika Corporation.
 - c. Pecora Corporation.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
 2. Basis of Design: Sika Corporation.
 3. Color: To be selected by Architect from full range.
 4. Movement Capability: Plus and minus 35 percent, minimum; ASTM C719.
 5. Service Temperature Range: Minus 40 to 170 degrees F.
 6. Shore A Hardness Range: 20 to 45; ASTM C661.
 7. Tensile Stress: 125 - 175 psi at 21 days; ASTM D412.
 8. Elongation to Break: 550 percent, minimum; ASTM D412

2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

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. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

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.

3.6 SCHEDULE

- A. Exterior Joints for Which No Other Sealant Type is Indicated: Silicone - DOWSIL 795.
- B. Control and Expansion Joints in Paving: Silicone - Self Leveling.
- C. Control, Expansion, and Soft Joints in Masonry, and Between Masonry and Adjacent Work: Silicone - DOWSIL 790.
- D. Lap Joints in Exterior Sheet Metal Work: Silicone - DOWSIL 795.
- E. Joints Between Exterior Metal Frames and Adjacent Work (except masonry): Silicone - DOWSIL 795.
- F. Interior Joints at Vertical and Underside of Concrete Panels and Planks: Polyurethane type.
- G. Under Exterior Door Thresholds: Clear silicone - DOWSIL 999-A.
- H. Interior Joints for Which No Other Sealant is Indicated: Acrylic - Master Builders Solutions MasterSeal NP 520.

- I. Control and Expansion Joints in Interior Concrete Slabs and Floors: Silicone - Self Leveling.
- J. Joints Between Plumbing Fixtures and Walls and Floors, and Between Counter tops and Walls: White silicone - sanitary type.

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. 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; 2018.
 - 2. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2015.
 - 3. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames; 2017.
 - 4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 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 A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
 - 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; 2021a.
- 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; 2021.

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; 2013.
- H. Underwriters Laboratories Inc. (UL):
1. UL (DIR) - Online Certifications Directory; Current Edition.
 2. UL 9 - Standard for Safety Fire Tests of Window Assemblies; 2009, Revisions 2020.
 3. UL 10B - Standard for Safety Fire Tests of Door Assemblies; 2009, Revisions 2020.
 4. UL 10C - Standard for Safety Positive Pressure Fire Tests of Door Assemblies; 2016, Revisions 2021.
 5. UL 1784 - Standard for Safety Air Leakage Tests of Door Assemblies and Other Opening Protectives; 2015; Revisions 2020.

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 compliance with overall fire rated separation requirements.
- C. Coordinate Work with frame and door opening construction and door hardware and glazing installation.
- 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 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. Joinery of Frame Members:
 - a. Full profile continuously welded type.
 3. 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. Joinery of Frame Members:
 - a. Full profile continuously welded type.
 3. Weatherstripping: Refer to Section 08 71 00.
 4. 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 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; 2009, Reapproval 2016.
 - 2. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- B. Architectural Woodwork Institute, Architectural Woodwork Manufacturers Association of Canada, and Woodwork Institute (AWI/AWMAC/WI (AWS)):
 - 1. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2014, with Errata 2016.
- C. Architectural Woodwork Institute (AWI):
 - 1. AWI (QCP) - Quality Certification Program; Current Edition.
- D. California Air Resource Board (CARB):
 - 1. CARB - Standard for Ultra-Low Emitting Formaldehyde (ULEF).
- E. Forest Stewardship Council (FSC):
 - 1. FSC - Forest Stewardship Council Standard for Chain of Custody Certification, FSC-STD-40-004, V2-1.
- F. 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.
- G. Underwriters Laboratories Inc. (UL):
 - 1. UL (Dir) - Online Certifications Directory; Current Edition.
 - 2. UL 10C - Standard for Safety Positive Pressure Fire Tests of Door Assemblies; 2016, Revisions 2021.
 - 3. UL 1784 - Standard for Safety Air Leakage Tests of Door Assemblies and Other Opening Protectives; 2015, Revisions 2020.

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 Qualification Statement.
- H. Installer's Qualification 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. Comply with AWI/AWMAC/WI (AWS) standards and Grade indicated, unless otherwise specified or indicated.

1. Grade indicated is 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.
- C. 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 work will comply with AWI/AWMAC/WI (AWS) requirements for Grade(s) 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 this work complies with specified requirements.
- D. Attach labels from certifying agencies approved by authority having jurisdiction.
- E. Certified Wood Materials: Furnish wood materials certified in accordance with FSC-STD-40-004, V2-1 including:
 1. Face veneer.
 2. Core material.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
 1. Licensed participant in AWI (QCP) - Quality Certification Program prior to commencement of fabrication and throughout the duration of the project.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this Section, with not less than five (5) years of documented experience.

1.9 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.

1.10 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.

1.11 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.

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: Book match.
 4. Veneer Panel Leaf Matching: 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 as ULEF for ultra-low emitting formaldehyde.
- 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 09 21 16 - Gypsum Board Assemblies: Placement of access frame unit anchors in gypsum board partitions.
 - 3. Section 09 90 00 - Painting and Coating: Field paint finish.
 - 4. 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.

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.
 - 4. Karp Associates, Inc.
 - 5. Nystrom Products Co.
 - 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. 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 17 43 - Integrated Composite Door Opening Assemblies.
 - 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; 2015.
 - 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); 2021.
 - 7. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020.
 - 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; 2021.
 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.
 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 2016.
 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.
- D. The Society for Protective Coatings (SSPC):
1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic); 2019.

1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work of this Section with related Door Hardware requirements.
 1. Provide reinforcement in storefront framing members to accommodate hardware items other than items specified in this Section.
 2. Preparation of storefront framing members to accommodate electrical hardware devices such as security access readers and automatic operators.
- C. Coordinate work of this Section with related Electrical requirements.
 1. Provide for electrical service wiring for electrical hardware devices such as security access readers, automatic operators, and similar related electrical 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.

1.5 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.

1.6 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: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- D. Installer: Company specializing in performing Work of this Section with minimum five (5) years documented experience.

1.7 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 - Care and Handling of Architectural Aluminum from Shop to Site.
- 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.

1.8 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.

1.9 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: Limit air leakage through assembly to 0.06 cfm/sq ft of wall area, measured at reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E283/E283M.
- 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 difference of 20 percent of design pressure, with minimum differential of 2.86 lbf/sq ft and maximum of 12.00 lbf/sq ft.
- 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 as partitions between building interior spaces with conditioned air on both sides.
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. Tubelite, Inc.
 - d. U.S. Aluminum, a C.R. Lurance Company.
 - e. YKK AP America.
 - f. Substitutions: Section 01 60 00 - Product Requirements.
 6. Basis of Design:
 - a. Kawneer Co., Inc.:
 - 1) Trifab VG 451, 2 inch sightline.
- C. Same manufacturer must be used for:
1. Aluminum-Framed Entrances and Storefronts.
 2. Glazed Aluminum Curtain Walls.

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 suite attachment requirements.
- F. Structural Supporting Anchors Attached to Reinforced Concrete Members:
 1. Design to suite 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. Flashings:
 - 1. Exposed Flashings: Sheet aluminum, finish to match framing members.
 - a. Thickness: 18 gage, 0.040 inch, minimum.
 - 2. Concealed Flashings: Sheet aluminum.
 - a. Thickness: 22 gage, 0.025 inch, minimum.
- L. Firestopping: As specified in Section 07 84 00.
- M. 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.
- N. Glazing Gaskets and Accessories: As recommended by storefront and glazing system manufacturers; type to suit application to achieve weather, moisture, and air infiltration requirements.
- O. Perimeter Sealants and Backing Materials: Provide sealants and backing materials complying with requirements specified in Section 07 90 00.
- P. 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 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 41 13 - Aluminum-Framed Entrances and Storefronts: Framing system to receive glazing in this Section.
 - 5. 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.
 - 7. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021.
 - 8. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009, Reapproval 2016.
 - 9. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
 - 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; 2008.
 - 2. GANA (SM) - GANA Sealant Manual; 2008.
 - 3. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.
- F. National Fenestration Rating Council Incorporated (NFRC):
 - 1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors; 2020.
 - 2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2020.
 - 3. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2020.
- 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 - Building Materials Directory; Current Edition.
 - 2. UL 10C - Standard for Safety Positive Pressure Fire Tests of Door Assemblies; 2016, Revisions 2021.

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 (following product data approval):
 - 1. Glass: Submit two samples, 12 x 12 inches in size, of each glass type.
 - 2. Glazing Units: Submit one 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 (1) percent (minimum of one) of each type and size.

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 (Clear):**
 - 1. Outboard Lite:
 - a. Coating:
 - 1) Low-E Coating (solar control type), on #2 surface.
 - a) Basis of Design:
 - (1) 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 (Diffused):**
1. Outboard Lite:
 - a. Coating:
 - 1) Low-E Coating (solar control type), on #2 surface.
 - a) Basis of Design:
 - (1) Guardian - SunGuard SNX 51/23.
 - b. Tint:
 - 1) Class 2 - Tinted:
 - (1) Crystal Gray.
 - 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. Translucent Finish Type:
 - 1) Acid etched texture on #3 surface.
 - a) Basis of Design: Gurardian - SatinDeco.
 - d. Glass Type:
 - 1) Fully Tempered Safety Glass.
 - e. 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.
- C. Type IG3 - Insulating Glass Unit (Tinted):**
1. Outboard Lite:
 - a. Coating:
 - 1) Low-E Coating (solar control type), on #2 surface.
 - a) Basis of Design:
 - (1) Guardian - SunGuard SNX 51/23.
 - b. Tint:
 - 1) Class 2 - Tinted:
 - (1) Crystal Gray.
 - 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.

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); 2020.
- B. Air Movement and Control Association International, Inc. (AMCA):
 - 1. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.
 - 2. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021.
- C. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7-10 - Minimum Design Loads For Buildings And Other Structures; 2011.
- D. ASTM International (ASTM):
 - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
 - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2020.

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 7-10, 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 Co.
 - 2. Airolite.
 - 3. Arrow United Industries.
 - 4. Construction Specialties Inc.
 - 5. Greenheck Corp.
 - 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, 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 full range of finish types.

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 06 10 53 - Miscellaneous Rough Carpentry: Wood blocking for support of wall cabinets, toilet accessories and other wall mounted Work.
 - 4. Section 07 21 00 - Thermal Insulation: Insulation for gypsum board assemblies requiring thermal insulation.
 - 5. Section 07 90 00 - Joint Protection.

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; 2020.
 - 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; 2020.
 - 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.
 - 7. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
 - 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; 2017.
 - 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.
 - 12. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.
 - 13. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2019.

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; 2018.
 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; 2020.
 16. ASTM C1104/C1104M - Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation; 2019.
 17. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 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.
 20. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019.
 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; 2019.
 23. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, Editorial Change 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; 2022.
 26. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009, Reapproval 2016.
 27. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C; 2019.
 28. ASTM E970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source; 2017, Editorial Change 2022.
 29. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, Editorial Change 2021.
- B. California Department of Public Health (CDPH):
1. CDPH Standard Method VOC VI.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 (Warnock Hersey Listed):
1. WH - Certification Listings; Current Edition.
- F. Underwriters Laboratories Inc. (UL):
1. UL - 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 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: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E19 by an independent testing agency.
- 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. Standard Gypsum Board: ASTM C1396/C1396M; paper faced; 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: 15, maximum.
 - b. Smoke Development: Zero.
 - c. Class: Class A.
 - 4. Finish Level: Refer to Finish Levels Schedule at end of this Section.
 - 5. Basis of Design:
 - a. NGC - Gold Bond Fire-Shield X.
 - 6. 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. 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. Toilet Areas WITHOUT contiguous shower stalls.
 - b. Drinking Fountain Areas.
 - c. Walls With Sink(s): Entire wall length and minimum height from finish floor to 8 feet high above finish floor unless otherwise indicated on Drawings.
 - d. Kitchen Food Preparation Areas.
 - e. Kitchen Food Storage Areas.
 - f. Food Serving Areas.
 - g. Dish Washing Area.

- h. Janitor And Custodian Closets.
- C. 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; 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.

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 or WH 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 Exterior Gypsum Ceiling Board Firecode X.
 - 8. Locations: Exterior soffits and ceiling in protected areas unless indicated otherwise on Drawings.
- B. Exterior 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 C1396/C1396M.
 - 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 or WH 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: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise. Includes trims such as corner beads, edge trim, control joints and expansion joints.
 1. Types: As detailed or required for finished appearance.
 - a. Continuous bead profile required for termination and protection of finish compound edge.
 - b. J-trim, without bead, is not allowed at gypsum board termination end unless indicated on Drawings.
 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
 3. Vinyl Beads and Trim:
 - a. Not permitted.
- B. Expansion Joints:
 1. Type: Accordion profile with factory-installed protective tape.
- C. Control Joints:
 1. Type: V-shaped metal with factory-installed protective tape.
- D. 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.
- E. 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.
- F. 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 for 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 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.

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 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Acoustic Ceiling Panels.
 - 2. Suspension Grid Systems.

- 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; 2020.
 - 2. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
 - 3. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
 - 4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2022.
 - 5. 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.
 - 6. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2022.

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 prior to, during, and after acoustic panel installation. If manufacturer's requirements are more stringent, comply with manufacturer's requirements.
 - 1. Uniform minimum temperature of 60 degrees F, and maximum humidity of 40 percent.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
 - 1. Furnish 200 sq ft of extra panels of each type and size of acoustical panel to Owner.

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 A**) :
 - 1. Basis of Design: Armstrong - Ultima.
 - 2. Classification: ASTM E1264, Type IV - mineral fiber with acoustically transparent water-repellent membrane.
 - a. Form: 2 - water felted.
 - b. Pattern:
 - 1) E - lightly textured.
 - c. Fire Class A.
 - d. Sag Resistant.
 - e. Mold and Mildew Resistant.
 - 3. Size: 24 x 24 inches.
 - 4. Thickness:
 - a. 7/8 inch.
 - 5. Light Reflectance: 88 percent.
 - 6. NRC: 0.75.
 - 7. CAC: 35.
 - 8. Edge: Formed to suit grid profile.
 - a. Tegral Beveled.
 - 9. Surface Color:
 - a. White.
 - 10. Suspension Grid Type as indicated in this Section:
 - a. Suspension Grid Type SG-1.

B. Acoustic Panels (Type B) :

1. Basis of Design: Armstrong, Health Zone Ultima (1935), Square, ASTM E1264, conforming to the following:
 - a. Classification: Type IV, Form 2 Pattern E, Fire Class A.
 - b. Size: 24 x 24 inches.
 - c. Thickness: 3/4 inch.
 - d. Composition: Mineral fiber.
 - e. Light Reflectance: 0.86 percent.
 - f. NRC: 0.70
 - g. CAC: 35.
 - h. Edge: Square.
 - i. Surface Color: White.
 - j. Surface Finish: Light texture.
 - k. Grid: Type 1 as specified in this Section.

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 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.

- C. Exposed fastener heads to be shop finished to match grid system finish type and color.
- D. 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. 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.
 - 3. Accessories.
- 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 utility boxes, devices and trim.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness; 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; 2023c.
 - 4. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2019a, Editorial Revisions 2020.
 - 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; 2018.
 - 7. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
 - 8. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004, Reapproval 2018.
 - 9. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021a.
 - 10. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.
 - 11. ASTM F1861 - Standard Specification for Resilient Wall Base, 2021.
 - 12. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
 - 13. ASTM F2195 - Standard Specification for Linoleum Floor Tile; 2018, Reapproval 2023.
- 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 and colors available; include moldings, transition

and edge trim as indicated on Drawings and otherwise recommended by manufacturer of Resilient Floor products; include installation instructions.

- C. Samples for Initial Selection: Two manufacturer's complete set of color samples illustrating the full range of finishes and colors available; submit for Architect's initial selections.
- D. 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.
- E. Mock-ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Architect's acceptance of finish color, texture and pattern, and workmanship standards.
 - 1. Mock-up Size and Location: One typical room; location as indicated by Architect.
 - 2. Incorporation: Mock-up may be incorporated into the final construction upon Architect's approval.

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 QUALITY ASSURANCE

- A. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter in accordance with ASTM E648 or NFPA 253.
- C. Smoke Density: 450 or less in accordance with ASTM E662.

1.6 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.

1.7 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 of the floor in an acclimatized, weather-tight space.
- D. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

- C. 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 WARRANTIES

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Vinyl Composition Tile: Provide five (5) year manufacturer's warranty.

1.10 EXTRA MATERIALS

- A. Section 01 77 00 - Closeout Procedures: Extra materials, spare parts and maintenance products.
- B. Resilient Tile Flooring: 50 sq ft of each type and color.
- C. Resilient Wall Base: 100 lineal feet of each type and color.

PART 2 PRODUCTS

2.1 RESILIENT TILE FLOORING

- A. Vinyl Composition Tile:
 - 1. Manufacturers:
 - a. Armstrong Flooring, Inc. (Basis of Design)
 - 1) Imperial Texture, Standard Excelon.
 - b. Mannington Commercial.
 - c. Johnsonite, a Tarkett Company.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
 - 2. Minimum Requirements: Comply with ASTM F1066, of Class specified.
 - a. Class 2 - Through pattern tile.
 - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter in accordance with ASTM E648 or NFPA 253.
 - 4. Smoke Density: 450 or less in accordance with ASTM E662.
 - 5. Tile Size:
 - a. 12 x 12 inches.
 - 6. Total Thickness: 0.125 inch.
 - 7. Colors and Patterns:
 - a. As indicated on Drawings.

2.2 RESILIENT WALL BASE

- A. Manufacturers:
 - 1. Johnsonite, a Tarkett Company. (Basis of Design)
 - 2. Burke Flooring.
 - 3. Roppe Corporation.
 - 4. Substitutions: Section 01 60 00 - Product Requirements
- B. Rubber Wall Base:
 - 1. Comply with ASTM F1861.
 - a. Type TS – Rubber, vulcanized thermoset.
 - b. Group 1 – Solid.
 - c. Style B – Top set, Cove.
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, 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 submitted samples.

2.3 ACCESSORIES

- A. Subfloor Filler: Premix latex; types recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by resilient flooring manufacturer.
- 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: Examination, coordination and project conditions.
- B. Verify that surfaces are flat and smooth to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- C. 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 resilient base.
- D. Moisture Testing: Moisture emissions from concrete subfloors must not exceed 5 lbs per 1,000 psi per 24 hours via the Calcium Chloride Test Method and not exceed 85% internal concrete relative humidity as tested in accordance with ASTM F2170-16b. If more restrictive value are required by flooring product manufacturer, comply with the more restrictive values.
- E. The pH level of the subfloor surface shall not be higher than 9.9. If higher, subfloor must be neutralized.
- F. Cementitious Sub-floor Surfaces:
 1. Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH. Test in accordance with ASTM F710.
 2. Verify that substrates exhibit no carbonization or dusting.
- G. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- H. Verify that required floor-mounted utilities are in correct location.

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 and depth of tread.
 2. Install stringers configured tightly to stair profile.
 3. Adhere over entire surface. Fit accurately and securely.
 4. Ensure the nosing fully conforms to the angle of the riser below and that the bottom edge abuts and joins the riser covering top edge without gap or void. Ensure that the bottom edge of the nosing 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 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; 2019.
 - 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. Green Seal (GS):
 - 1. 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. The 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 or 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 Seal Finish (Does not include Polished Concrete Floor Finishing, see Division 3):
 1. Use preparation procedures and products as recommended by manufacturer of concrete floor sealer.
- 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 weld 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 of block filler at following locations.

- b. Two top coats of latex finish.
 - c. Locations:
 - 1) Lobby Areas.
 - 2) Corridors.
 - 3) Stairs 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.
- D. Interior Concrete Floors Requiring Seal 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 Penetrating Liquid Densifier: Lithium silicate sealer, hardener, and densifier.
 - a. Prosoco - Consolideck LS Hardener/Densifier. (Basis of Design)
 - b. Convergent Concrete Technologies - Pentra-Sil (HD).
 - c. Substitutions: Section 01 60 00 - Product Requirements.
 - 2. Two coats Protective Surface Treatment: Lithium silicate hardener.
 - a. Prosoco - Consolideck PolishGuard Finish. (Basis of Design)
 - b. Convergent Concrete Technologies - Pentra-Finish (HG).
 - c. Substitutions: Section 01 60 00 - Product Requirements.
- E. 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.
- F. 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.
- G. 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.
- H. 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.
- I. 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.
- J. 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.
- K. 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.
- L. 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.
- M. 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.
- N. 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.
- O. 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.
- P. 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 14 00

SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Room Identification Signs.
 - 2. Applied Vinyl Graphics.
 - 3. Dimensional Letter Signs.
- B. Related Requirements:
 - 1. Section 01 40 00 - Quality Requirements: Mockup requirements indicated in Schedule of Mockups at end of Section 01 40 00.
 - 2. Sections related to identification of Plumbing, HVAC, and Electrical work.
 - 3. Sections related to Civil and Site work.

1.2 REFERENCES

- A. American Iron and Steel Institute (AISI).
- B. 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).
- C. Americans with Disabilities Act (ADA):
 - 1. ADA Standards - ADA Standards for Accessible Design; 2010.
- 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.
 - 3. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
- E. 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.
- F. International Code Council (ICC):
 - 1. ICC A117.1 - Accessible and Usable Building and Facilities; 2017.
- G. Ingress Protection Code (IP Code):
 - 1. IP Code - Degree of Protection Provided by Enclosures; ANSI/IEC 60529 2020.
- H. UL Standards (UL):
 - 1. UL 48 - Electric Signs; Edition 15, 2011, ANSI Approved 2021.
 - 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 MANUFACTURES

- A. Signs and Accessories:

1. Acorn Sign Graphics.
2. APCO Graphics.
3. ASI Sign Systems.
4. Bayuk Graphic Systems, Inc.
5. Best Sign Systems.
6. Interface Architectural Signage, Inc.
7. InPro Corporation (Signscape).
8. Mohawk Sign Systems.
9. Rowmark, LLC.
10. Scott Sign Systems, Inc.
11. Signage Industries Corporation.
12. 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. Corners: Radiused, 1/2 inch.
 11. Edges: Beveled and smooth.
 12. Graphic Style: International type.
 13. 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.
 14. 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 (6) 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** (4 signs required)
 - 2. Copy: **TOBACCO FREE PROPERTY** (4 signs required)

2.5 DIMENSIONAL LETTER SIGNS

- A. Exterior Metal Letters: Architectural grade aluminum.
 - 1. Thickness:
 - a. 1 inch.
 - 2. Height:
 - a. Refer to Copy and Locations in following paragraphs.
 - 3. Copy Style: Helvetica Medium, unless indicated otherwise on Drawings.
 - 4. Finish: Brushed.
 - 5. Copy and Locations: Characters to be designated by Architect.
 - a. Building Face - Address Identification (as required by building codes):
 - 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) Mounted on building wall; height and location to be as follows:
 - a) To be designated by Architect:
 - 2) 40 upper case characters, 12 inches high. (40 total characters)

2.6 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.

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.

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.

END OF SECTION

SECTION 10 28 00
TOILET ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Toilet 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.

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, 2015.
 - 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
 - 4. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar, 2015.
 - 5. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2018.
 - 6. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.
 - 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; 2018.
 - 10. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2017.

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 for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect (Exception: Electric hand dryers.).

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. 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. Basis of Design:
 - a. [Bobrick B-254](#) (surface mounted).
 - b. [Bobrick B-353](#) (recess mounted).
- H. Baby Changing Table (BCT):
 1. Basis of Design:
 - a. [Bradley 963](#) Series: Plastic; color as selected by Architect (surface mounted).
- I. Coat Hook (CH): Solid aluminum casting, matte finish; rubber bumper protects wall and partition surfaces; 4 screws attachment base.
 1. For toilet stall doors that swing into the stall, provide one (1) per each stall; locate inside stall door.
 2. For toilet stall doors that swing out of the stall, provide two (2) per each stall (one on the inside and one on the outside of door).
 3. Secure hooks with machine screws from hook side and pan head sleeve nuts (hex socket) from opposite end for thru-bolt assembly.
 4. Basis of Design:
 - a. [Bobrick B-212](#).

2.5 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. 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; 2013a, Reapproval 2017.
- 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; anchorage details.
- C. Shop Drawings:
 - 1. Indicate mounting measurements for brackets; 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 re-certification 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 gage.
 - 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.

2.2 ACCESSORIES

- A. Extinguisher Brackets:
 - 1. Formed stainless steel.

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.

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 brackets at location indicated on Drawings.
- C. Secure rigidly in place.
- D. 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 Locations by Type:
 - 1. 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 (bracket installed if no cabinet indicated).
 - 2) Assembly Areas(bracket installed if no cabinet indicated).
 - 3) Work Areas(bracket installed if no cabinet indicated).
 - 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).
- B. Fire Extinguisher Quantities by Type:
 - 1.
 - 2. Type A:B:C: Twelve (12) each.

END OF SECTION

